Aalto University
School of Business

ANALYST COVERAGE AND EARNINGS MANAGEMENT BEHAVIOUR IN FINNISH LISTED COMPANIES

Master's Thesis

Thomas Danford
Aalto University School of Business
Accounting

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School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

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Author Thomas Danford

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Abstract

The purpose of this thesis is to examine how analyst coverage influences the use of earnings management in Finnish listed companies. The effects of outside monitoring by stock analysts can be explained through two seemingly logical but opposite arguments. First, analysts can be viewed as third-party observers who monitor managers and keep them away from manipulation. On the other hand, one may argue that the pressure to achieve analyst expectations can promote the use of these same actions. Previous research has focused mainly on US companies as well as single earnings management methods at a time, whereas this thesis expands the geographical coverage of results and examines three different manipulation methods on the same data sample for a broader perspective on the use of earnings management.

Data for analyst coverage is collected from the IBES database and financial data for firms is gathered from the Thomson Reuters Eikon and Orbis databases as well as annual reports in some cases, for a final sample size of 1640 firm-year observations through years 2005-2018. Discretionary accruals are estimated using the modified Jones model (Dechow et al. 1995), whereas sales manipulation and overproduction are estimated by following Roychowdhury's (2006) processes utilizing models developed by Dechow et al. (1998). OLS and 2SLS regressions are applied to analyse the relationships between analyst coverage and these three earnings management methods.

I find strong evidence showing that the way firms choose to manage earnings is influenced by analyst coverage. The results show a significant negative association between coverage and the use of discretionary accruals, with covered firms using them less than uncovered firms, higher coverage resulting in lower levels of use, and changes in coverage resulting in contrary changes in use. Overproduction also demonstrates an association with coverage which is mostly positive but appears to only apply based on whether a firm is covered or not and which direction its change in coverage occurs. Sales manipulation as well as the sum of the three measured methods show no significant association with analyst coverage. Overall, the results support both arguments of the effect of analysts, monitoring and pressure, highlighting the need to measure the available methods individually rather than see earnings management as one group of interchangeable activities.

Keywords earnings management, analyst coverage, accrual-based earnings management, real earnings management, discretionary accruals, sales manipulation, overproduction

Aalto-yliopisto
Kauppakorkeakoulu

Aalto yliopisto, PL 11000, 00076 AALTO
www.aalto.fi

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Tiivistelmä

Tämän tutkielman tarkoitus on tarkastella analyytikkoseurannan vaikutusta tuloksenohjaukseen suomalaisissa listatuissa yhtiöissä. Analyytikoiden ulkoisen valvonnan vaikutukseen on kaksi ilmeisen loogista, mutta päinvastaista, perustelua. Analyytikot voidaan nähdä ulkoisina tarkkailijoina, jotka valvovat johtoa ja pitävät heidät täten pois tuloksen manipuloinnista. Toisaalta paineet saavuttaa analyytikoiden asettamat odotukset voivat johdattaa heidät käyttämään näitä samoja keinoja. Aikaisemmat tutkimukset ovat keskittyneet lähinnä yhdysvaltalaisiin yhtiöihin sekä yksittäisiin tuloksenohjauskeinoihin, kun taas tämä tutkielma edistää tulosten maantieteellistä kattavuutta ja tarkkailee kolmea eri keinoa tavoitellen laajempaa näkökulmaa aiheeseen.

Data analyytikkoseurannasta on kerätty IBES-tietokannasta ja yhtiöiden taloudelliset tiedot ovat Thomson Reuters Eikon- ja Orbis-tietokannoista sekä joissain tapauksissa vuosikertomuksista. Lopullinen otos on 1640 havaintoa vuosilta 2005–2018. Harkinnanvaraiset jaksotukset on arvioitu käyttäen muokattua Jonesin mallia (Dechow et al. 1995), kun taas myynnin manipulaatio sekä liikatuotanto on arvioitu seuraamalla Dechow et al. (1998) malleja hyödyntävää Roychowdhuryn (2006) menetelmää. Analyytikkoseurannan ja näiden kolmen tuloksenohjauskeinon suhteen analysointiin on käytetty PNS-menetelmää (OLS) sekä kaksivaiheista PNS-menetelmää (2SLS).

Löydän vahvaa näyttöä siitä, että analyytikkoseuranta vaikuttaa yhtiöiden tapaan käyttää tuloksenohjausta. Tulokset osoittavat selkeästi merkitsevää käänteistä suhdetta seurannan ja jaksotuserien manipuloinnin välillä seurannanalaisten yhtiöiden käyttäessä sitä vähemmän, suuremman seurannan johtaessa sen vähäisempään käyttöön sekä seurantamuutosten aiheuttaessa käänteisiä muutoksia sen käytössä. Liikatuotanto osoittaa merkitsevää ja pääosin positiivista suhdetta seurantaan, mutta se koskee ainoastaan seurattavuutta sekä muutosten suuntaa eikä seurannan tasoa tai muutoksen suuruutta. Myynnin manipulointi sekä näiden kolmen menetelmän yhteenlaskettu käyttö eivät osoita merkitsevää suhdetta seurantaan. Tutkimuksen tulokset puoltavat molempia perusteluja analyytikoiden vaikutuksesta yhtiöiden johtoon – valvonta sekä paine suoriutua – korostaen tarvetta mitata tiedossa olevia keinoja erillään eikä käsitellä tuloksenohjausta yhtenä vaihtoehtoisten toimien ryhmänä.

Avainsanat tuloksenohjaus, analyytikkoseuranta, jaksotuserien manipulointi, liiketoimintojen manipulointi, harkinnanvaraiset jaksotukset, myynnin manipulointi, liikatuotanto

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1 Introduction

This thesis examines the behavioural effects that outside monitoring by stock market analysts has on managers in terms of their decisions to manipulate reported earnings. Due to a broad range of incentives for this type of behaviour and an availability of different methods to carry out these actions, valid findings of these questions can offer valuable insight to many areas of academic research as well as to market participants. By reviewing key earnings management literature and connecting that to the available research about the governance role of analysts, I create hypotheses and test them using data from Finnish listed companies, expanding the existing literature and offering ideas for future research.

Managers sometimes have an incentive to manipulate reported earnings in order to influence how their financial reports display the company's performance and situation. It is a case of managerial judgment which is commonly described as either an intent to mislead stakeholders in the form of inaccurate information, or as an attempt to incorporate management's private information in reports for improved reporting value (Healy & Wahlen 1999). The reasons for such behaviour can come from either outside or inside factors such as external market expectations or internal management compensation schemes, most often leading to the benefit of either the company or individual managers. This manipulation can result in either higher or lower reported earnings, depending on the incentives and their requirements.

A company's reported earnings consist of its operational cash flows combined with certain adjustments that are made to those cash flows during the accounting process, both components of which can be used to manipulate reported earnings. The more traditional method involves the adjustments, or accruals. While some of those adjustments are required by accounting standards, others are voluntary and ultimately up to the manager's discretion which can potentially enable manipulative behaviour. This discretionary portion of total accruals only affects the timing of cash flows and should thus reverse over time, but essentially, they can be used to raise or lower a period's reported earnings. The other component of reported earnings, cash flows from operations, can be manipulated through actual business decisions such as temporarily

discounted terms or changing the level of discretionary expenses such as R&D or advertising, resulting in short-term earnings shifts.

Stock market expectations, most often in the form of analyst estimates, are a key factor behind earnings management decisions. There is evidence that companies who meet or beat analyst estimates perform better than those that do not, both in the short and long terms (Bartov et al. 2002). This puts pressure on managers to meet expectations which in some cases can be achieved through earnings management, raising the question whether a relationship can be found between analyst coverage and earnings management behaviour. Prior literature (Yu 2008, Degeorge et al. 2013) has shown that analyst coverage constrains accrual-based earnings management at least in countries of high financial development. On the other hand, the effect on real earnings management has been found to be the opposite (Sun & Liu 2016), showing a positive association between the two factors. When considering the use of both methods and the behaviour of managers, there is evidence from US companies which shows that firms simultaneously increase accrual-based earnings management and decrease real earnings management when losing coverage (Irani & Oesch 2016). This is in line with the documented evidence of managers' behavioural preferences while under the watch of stakeholders such as auditors, regulators, or analysts (Graham et al. 2005).

The connection between analyst coverage and earnings management behaviour offers an interesting research topic because there are logical arguments for why coverage could both increase and decrease manipulative actions. On one side is the "monitoring effect", where analysts can be viewed as third-party governance observers who keep management away from hiding the true condition of their company and therefore not relying on earnings management. On the opposite side there is the "pressure effect", based on which one may view the pressure of achieving analysts' expectations as a factor which instead promotes the use of various forms of earnings management. Therefore, this raises a fascinating question as to what the true association is and how investors and other market participants should view the analyst-management relationship. Is it better in terms of transparency for a company to have extensive analyst coverage, or does it inversely result in decisions that only contribute to short-term stock market performance?

The primary objective of this thesis is to examine how the quantity of analyst coverage influences managers' earnings management decisions in Finnish listed companies. Earnings management is monitored through three methods covering both accrual-based and real earnings management, which offers a broad picture of managers' behaviour and thus a better understanding of the full effects of analyst presence. These effects of coverage on the three methods – discretionary accrual use, sales manipulation, and overproduction – are examined both alone and by monitoring each other's simultaneous changes. Analyst coverage is utilised both in terms of covered versus uncovered firms, the level of coverage, as well as through changes in coverage. Change is measured by numerical change, direction of change, and changes in coverage from zero to one and one to zero analysts.

Using a sample of 1640 firm-year observations from 2005 to 2018, I find strong evidence that analyst coverage impacts the way firms choose to manage their earnings. There is a significant negative association between analyst coverage and discretionary accrual use, meaning that more coverage results in less of its use and vice versa. This result is present when comparing covered firms with uncovered firms as well as when measuring by the level of coverage. Additionally, similar results appear in situations of change as increases in coverage result in decreases in use of discretionary accruals. Coverage is also associated with overproduction, but the connection is mostly positive and not as distinct across all tests as with discretionary accruals. Finally, the evidence points towards a lack of association between coverage and sales manipulation as well as the combined use of these three earnings management methods.

This study contributes to the existing literature surrounding the relationship between analyst coverage and earnings management use in several ways. Firstly, it expands the geographical coverage of research results on this topic by examining specifically Finnish listed companies. Most previous studies have been conducted using U.S. data which may not be comparable to markets in other geographical areas. There is prior literature indicating differences in the effects based on a country's financial development (Degeorge et al. 2013) as well as level of investor protection (Sun 2009). For this reason, it is important to expand the understanding of behavioural patterns globally if looking for actionable benefits from research and practice. This

global expansion of results may also be beneficial in the global interpretation of behavioural patterns in other research areas.

Secondly, this study contributes by including three methods of earnings management along with their combined use to expand the understanding of manager behaviour as well as the relationship between these different methods. The most prominent studies on this topic, such as that by Yu (2008), involve just one method which only allows a limited interpretation of the use of earnings management. Results from different studies can of course be combined but there will always be discrepancies in samples and methods which may impact the validity of conclusions. The results from this study highlight the importance of measuring the methods individually rather than treating methods under terms such as real earnings management as homogeneous groups. Speaking of samples, the third way in which this thesis contributes to existing research is through a more recent sample from years 2005 to 2018. Nearly all prior studies use data which does not include the 2010s, leaving a gap of uncertainty as to whether these results are still valid in a rapidly changing business and information environment.

Lastly, this study contributes to future research by presenting a new instrumental variable option for analyst coverage. Using the variable of expected coverage based on brokerage size introduced by Yu (2008) as inspiration, I develop an alternative measure of expected coverage which does not require the brokerage-specific data of employed analysts. Instead, it uses total market analyst counts to capture the variation in a firm's analyst coverage that is caused by change in overall analyst activity within the marketplace.

This thesis consists of two major sections: the theoretical framework and the empirical research. After the introduction, it proceeds into presenting the topic of earnings management through definitions, incentives of use, and methods of measuring these activities. It then shifts to analyst coverage and further into the relationship with earnings management use by evaluating the role of analysts in financial markets. To finish off the theoretical framework, it presents the relevant literature on the topic of this thesis, offering an understanding of prior findings before proceeding to the empirical research. The empirical section begins with research design which explains the research hypotheses, introduces the chosen methodology, and describes the collection and use of the data sample. It then moves onto the experiments, testing the

relationship between analyst coverage and earnings management from various points of view. Chapter 6 contains discussion about the findings, their practical and academic significance, and the limitations of the study. Finally, Chapter 7 summarizes the conclusions of this study by reflecting on each section and sharing ideas for future research.

2 Earnings management

This chapter begins the theoretical framework of this thesis, introducing the topic of earnings management, offering an in-depth literature review which helps better understand the results of prior studies as well as the findings of this thesis. The chapter begins by defining earnings management and its two major implementation methods, accrual-based and real earnings management. It then reviews some of the key research findings of each method in order to explain exactly how these methods are used and what their effects are. After this foundation, it explains the many incentives behind the use of earnings management, what benefits does it offer and to whom. Finally, it introduces various estimation models developed to detect and measure the use of earnings management, crucial tools used in this thesis as well as most of the research surrounding this topic.

2.1 Defining earnings management

It is important to first define clearly what the key terms in this thesis mean, both for proper understanding as well as comparability to other research in this area. There are different types of earnings management behaviour and therefore different definitions for each, but the most common definitions for the broad term come from Schipper (1989), and Healy and Wahlen (1999).

Among the first definitions of earnings management, Schipper (1989, p. 92) described it as *"a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain"*. Later, and perhaps nowadays more commonly referred to, Healy and Wahlen (1999, p. 368) gave a similar but more extensive definition:

> *"Earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."*

Many definitions of earnings management focus on managerial intent and highlight at least to some level the aim of misleading stakeholders. However, it should be noted that not all earnings management is opportunistic in nature since there is always some discretion involved when applying accounting standards, such as with various estimates. Healy and Wahlen (1999) mention that, in addition to complying with reporting standards, financial reports should also convey management's private information of the firm's performance as a way of improving the value reporting offers to stakeholders. To do so effectively, they have various opportunities in terms of which reporting methods to utilise.

Dechow and Skinner (2000) highlight that not using any earnings management is not an optimal solution, and that there are clearly different levels of earnings management all with different types of motivation and results. In line with Healy and Wahlen (1999) they also argue, for example, that a certain level of smoothing periodic cash flow fluctuations in order to generate more useful information for investors assessing a firm's performance should not be considered misleading earnings management. This, however, is where the distinction between adding value and misleading comes into question, since auditing is not perfect and pressure from both internal and external stakeholders can affect management's judgment. In Chapter 2.2, I examine the incentives behind earnings management in more depth.

Earnings management is commonly divided into two types: accrual-based earnings management and real earnings management (Schipper 1989; Healy and Wahlen 1999). In the following two chapters I will go into these two types in more detail, discussing what they are, how they differ from each other, how they have been researched, and what the current trends look like in terms of earnings management behaviour.

2.1.1 Accrual-based earnings management

Healy (1985) explains that a company's reported earnings are a combination of its operational cash flows and certain adjustments that are made to those cash flows during the accounting process. These adjustments are called accruals and they can be further divided into non-discretionary and discretionary accruals. Non-discretionary accruals are adjustments that are

required by accounting standards such as systematic depreciation of long-term assets, whereas discretionary accruals are adjustments which accounting standards allow but are ultimately up to a manager's discretion such as the method of that depreciation. Therefore, the use of discretionary accruals gives managers an opportunity to perform accrual-based earnings management in order to manipulate financial reporting, either to improve or weaken the earnings of a given accounting period.

Since accruals are simply adjustments to the timing of cash flows they will eventually reverse with time, also known as accrual reversal, and in theory should not have long-term effects on future earnings. Therefore, poorly performing companies cannot use them to avoid negative earnings changes for long, whereas they give companies with consistent earnings growth an opportunity for more flexibility with earnings. For example, they can use accruals to smoothen earnings over the short-term as well as over longer business cycles. While accrual reversal should cancel out any long-term effects on future earnings, some behavioural findings have been made especially in the field of finance. For example, Sloan (1996) found a significance in the information value of accrual and cash flow distribution with regards to valuation, as high levels of accruals resulted in lower future stock returns according to his research. From this he concluded that investors overestimate the persistence of accruals.

Dechow and Skinner (2000) demonstrated the different levels of accrual-based earnings management as well as their differentiation from fraud by placing accounting choices on a scale ranging from conservative to fraudulent accounting. According to them, companies can decrease earnings by using conservative adjustments such as over-recognition of provisions or reserves as well as overvaluing various acquisition- and restructuring-related expenses or write-offs. On the other hand, earnings can be aggressively improved through actions such as overstating provisions for bad debts or drawing down provisions prematurely. They also highlighted that there is a clear distinction between these actions and those considered fraudulent, such as recording unrealizable or fictitious sales, or falsely overstating inventory.

Of the two main earnings management methods discussed in this thesis, accruals and cash flows from real activities, discretionary accruals have been the more traditional subject of academic research for decades and their connection to other business behaviour has been studied across a

wide variety of topics. Burgstahler and Dichev (1997) provided evidence clearly showing that firms manage earnings in order to avoid both decreases in earnings as well as absolute losses. They analysed the distribution of earnings changes and total earnings and found significant differences in the frequency of small earnings decreases compared to small earnings increases around zero. This was a result of earnings management through a combined use of both accruals and cash flows from operations, which is often the case especially in more recent literature.

Becker et al. (1998) studied how audit quality impacts the use of discretionary accruals and found that companies with non-Bix Six auditors (a proxy for lower audit quality), increase their earnings significantly more through discretionary accruals than those with Bix Six auditors. Both the median and absolute use of discretionary accruals were also greater among firms with lower audit quality. Similar results of how audit quality can restrain managers' opportunistic use of accrual-based earnings management have been found by others as well (Krishnan 2003; Kim et al. 2003).

The aggressive use of discretionary accruals and equity offerings, both initial and seasoned, has been widely researched and found to have a clear link with future stock returns. Both Rangan (1998) and Teoh et al. (1998) showed that companies who use discretionary accruals to report higher net income prior to or around the time of seasoned equity offering yield lower abnormal returns and net income both for the following year and long-term. DuCharme et al. (2001) also found similar results when researching initial public offerings (IPO). An abnormally high use of accruals, both in the year prior to the IPO as well as the actual IPO year, showed a significant negative relation with post-IPO investor returns. They also compared IPO valuations based on the use of accruals and found that firms with higher levels of discretionary accruals received higher initial valuations than those firms with less managed accruals. Additionally, when comparing how the different components of reported earnings effect valuation, they found that discretionary accruals were valued similarly to unmanaged accruals and even higher than cash flows from actual operations.

2.1.2 Real earnings management

In addition to manipulating accruals within the accounting process, managers also have the option of making actual business decisions which will help them reach short-term earnings benchmarks. While discretionary accruals are only methods of accounting and do not impact a company's operations, real earnings management through actual operational decisions directly affects cash flows. Roychowdhury (2006, p. 337) defines real earnings management as:

> *"Departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations."*

He further explains that while many of the activities used for real earnings management may be beneficial and optimal for a company in some situations, abnormal or continuous use of these methods reflects a motivation to meet or beat earnings targets instead of making optimal long-term decisions. In the study, he researched the use of operational activities in earnings management, specifically the methods used and whether certain firm-specific factors influenced the scope of real earnings management. There was clear evidence that institutional ownership restricts the use of such methods, which in return raises questions about whether these activities are economically optimal if the presence of knowledgeable investors restricts it.

Some other firm-specific factors were also found to positively associate with the use of real earnings management, such as presence of debt outstanding and manufacturing industry membership. Firms with high market-to-book ratios, also called growth firms due to their good growth opportunities, indicated a positive connection as well though not as strong. Some explanation to this is offered by Skinner and Sloan (2002), who found that growth firms experience much greater negative responses to missing earnings benchmarks, thus motivating managers to avoid them by using earnings management. Several studies, including Roychowdhury (2006) and Burgstahler and Dichev (1997), also found a strong link between firms trying to avoid negative earnings surprises and their use of real earnings management, with the common methods of achieving this including sales manipulation, overproduction of goods and reduction of discretionary expenses. These three methods have become common

indicators in the detection of real earnings management. Dechow and Skinner (2000) also mention similar methods as they explain how deciding to accelerate or delay sales, or advance or postpone discretionary expenses can all be used in order to achieve a desired change in earnings for a given reporting period, while staying within the limits generally accepted accounting principles.

Roychowdhury (2006) explains that by temporarily discounting prices or offering other affordable terms, a firm can manipulate its sales and thus create a short-term boost which improves its reported numbers for that period. Since lower prices most often lead to lower margins, these are in many cases not economically optimal practices and mainly contribute to short-term improvement. In manufacturing firms, earnings can also be manipulated through production levels, specifically in the form overproduction which leads to a lower per unit cost as fixed costs are spread across more units. This results in a lower cost of goods sold for those units and thus better operating margins in the reporting period. This can, however, also cause extra costs such as storage which would not be recovered from sales due to the surplus of inventory, therefore utilising overproduction only makes sense if these costs do not override the acquired benefits in cost of goods sold. Finally, improving earnings by cutting discretionary expenditure is commonly used since they are typically written off in the same period and many of these expenses are not in direct connection with current period sales. Examples of such items may include expenses from research and development, administration, and some advertising. Of course, temporary reductions can have a negative effect on future period sales since there should be a reason why they were originally in place.

In recent years, real earnings management has increasingly gained popularity within the academic discussion and research seems to now be focusing more on it instead of accrual-based earnings management. The topics have been similar to those mentioned earlier in Chapter 2.1.1, for example the connections with audit quality and equity offerings, along with other topics such as cost of capital and board independence.

Chi et al. (2011) found strong and consistent evidence that both higher audit quality and longer auditor tenure are linked to more use of real earnings management among companies with motivation to manage earnings. They argue that it is used as an alternative to accrual-based

earnings management which, as mentioned earlier, higher audit quality has been proven to restrict (Becker et al. 1998; Krishnan 2003; Kim et al. 2003). Cohen and Zarowin (2010) also found a higher amount of real earnings management around seasoned equity offerings in the presence of a higher audit quality and longer auditor tenure. Additionally, when comparing the use of accrual-based and real earnings management in these situations, they found that engaging in real earnings management was more associated with future years' earnings declines and thus appeared to be more harmful.

With regards to cost of capital, several studies have shown that capital markets take notice of the use of real earnings management and demand a higher risk premium in these cases. Kim and Sohn (2013) researched this with regards to cost of equity capital and found a clear association regardless of the documented costliness of using real earnings management, suggesting opportunistic short-sightedness among managers. Ge and Kim (2014) studied the effect specifically on new corporate bonds and found that overproduction has a negative effect on credit ratings, while overproduction and sales manipulation link to larger spreads in bond yields.

In a commonly cited study, which appears to have inspired somewhat of a shift in the earnings management literature from discretionary accruals more towards real earnings management, Graham et al. (2005) surveyed over 400 CFO's about their opinions and preferences regarding earnings benchmarks and managing earnings. The goal was to understand how managers think and behave in comparison to the theoretical framework on this topic. According to the results, managers consider outside parties to have more interest in reported earnings rather than cash flows, and that meeting key benchmarks is crucial for credibility and worth the trade-off between short-term market pleasing and long-term value creation. 78% of the respondents preferred smooth earnings at the cost of economic value, the main reason being the short-term overreactions in stock price caused by earnings surprises.

But the key takeaway from the survey by Graham et al. (2005), at least for the purpose of this thesis, was that the surveyed managers demonstrated a much higher willingness to manage earnings though real activities rather than accounting accruals. One of the explanations given to this had to do with auditors and their ability to evaluate the two methods of manipulation, and how the use of discretionary accruals is easy for them to question whereas challenging real

business activities as a way of manipulation is very difficult to prove. Other responses also highlighted a specific effort to avoid any numbers-based earnings management, especially due to strict regulatory oversight in the aftermath of accounting scandals and the subsequent passing of the Sarbanes–Oxley Act (SOX) in the United States in 2002.

SOX is a significant part of the earnings management discussion and its impact on management behaviour has been researched in great depth. In short, the legislation was passed in the wake of several financial scandals, most notably the Enron scandal, and was meant to hinder misbehaviour on the management level by requiring more oversight, tightening governance and audit standards, and holding management accountable for the accuracy of financial statements via tougher consequences (Zhang 2007). Cohen et al. (2008) studied the differences in earnings management pre- and post-SOX and found clear evidence of a significant shift in behaviour as a result of the law. They found that accrual-based earnings management increased leading up to 2002 and then decreased sharply afterwards, while the use of real earnings management experienced a similar but opposite development. They argue that the new legislation steered managers more towards manipulating earnings through real activities instead of using accounting-based methods, consistent with the survey results from Graham et al. (2005) as well as the findings by Roychowdhury (2006).

This thesis focuses on Finnish firms and therefore SOX should not significantly affect them. However, all publicly listed firms in the EU were required to transition from local country accounting rules to International Financial Reporting Standards (IFRS) in 2005, including Finnish listed companies, and this adoption has also been researched with regards to its effects on earnings management behaviour. The results are not as consistent as those related to SOX, as many studies, such as Jeanjean and Stolowy (2008) and Callao and Jarne (2010), have in fact found an increase in earnings management activity since the adoption of IFRS especially with regards to the use of discretionary accruals. Other studies, including Barth et al. (2008) and Zeghal et al. (2012), suggest an improvement in earnings quality but it is worth noting that all these studies focus on slightly different aspects of IFRS. For example, some focus on early adapters while others only consider firms that transitioned once IFRS become mandatory, therefore the results may be conflicting and should thus not be overgeneralised.

Doukakis (2014) researched the effects of mandatory adoption of IFRS on both accrual-based and real earnings management using a broad sample of European firms, also comparing them to earlier voluntary adopters. The results showed no significant positive or negative impact of the IFRS adoption on the levels of either accrual-based or real earnings management. Tirkkonen (2013) also studied the impacts of IFRS adoption with regards to both accrual-based and real earnings management, however she focused on only Finnish listed companies which is highly relevant to this thesis. Her findings suggest that the transition from Finnish Accounting Standards (FAS) to IFRS increased the use of both accrual-based earnings management as well as one aspect of real earnings management, overproduction, in Finnish listed companies. The level of sales manipulation did not exhibit a statistically significant difference between the use of these two accounting standards. She also found significant changes in levels of both sales manipulation and overproduction during the data period in different years and specifically different economic environments, which were unrelated to IFRS adoption. This suggests that companies may adjust earnings management behaviour based on the existing macroeconomic situation, for which some prior evidence also exists (Agarwal et al. 2007).

2.2 Earnings management incentives

The reasons why managers decide to engage in earnings management, despite the many long-term downsides mentioned in previous chapters, have been studied in great depth. This is crucial information in order to better understand manager behaviour and ultimately set reporting guidelines and other regulation which improve transparency and discourage misuse. Most studies, such as Dechow and Skinner (2000) as well as the literature review by Healy and Wahlen (1999), mention capital market expectations and valuation as the main reason for earnings management. Additionally, managers are motivated to act by contractual reasons, both internal and external, as well as other reason such as regulation. This chapter discusses such incentives in more detail and offers examples for each category.

2.2.1 Market-related incentives

Financial reports shared by companies are a primary source of information based on which investors and analysts form a valuation and hence influence stock prices. Therefore, it can create an incentive for managers to shape that information in a way which displays the company as they wish and influences short-term market performance. Three key market-related benchmarks are repeated in prior literature for having an impact on managers' earnings management behaviour: meeting or beating analyst forecasts, reporting positive earnings and avoiding losses, and reporting higher earnings than in the comparison period (Degeorge et al. 1999; Dechow & Skinner 1999). Additionally, studies have shown that companies manage earnings by both increasing and decreasing them, depending on what is beneficial to their situation (Burgstahler & Eames, 2006; Nelson et al. 2001; Bartov et al. 2002).

Stock market expectations, most often in the form of analyst estimates, are a key factor behind earnings management decisions. Bartov et al. (2002) present evidence that companies that meet or beat analyst estimates perform better, both in the following quarter and three following years, compared to those that do not. They argue that the positive earnings surprise offers investors information of future performance which improves their confidence in the company and thus rewards it with better stock market returns.

The second benchmark incentive which managers thrive for is to report positive earnings or avoid losses. As mentioned earlier, Burgstahler & Dichev (1997) found clear evidence that managers are under pressure to report positive earnings, as the frequency of earnings just above zero is much higher than earnings just below zero. Furthermore, they estimated pre-managed earnings and compared them to reported earnings, finding that 30 to 44 percent of companies showing a small pre-managed loss were found to take actions in order to report a profit. This is consistent with Degeorge et al. (1999) who found a hierarchy among the three common benchmarks, stating that reporting a profit is most important, followed by reporting at least equal earnings as one year earlier, and lastly meeting or beating analyst estimates.

Reporting growing earnings is the third market-related benchmark which has been found to impact managers' earnings manipulation behaviour. Barth et al. (1999) researched the

phenomena of increasing earnings and found that, after controlling for other factors such as growth and risk, the market awards companies with this type of earnings history with significantly higher price-to-earnings multiples. Furthermore, the longer a company's trend of yearly earnings increases continues for, the higher its price-to-earnings multiple gets, with the largest single-year increase occurring between years four and five. For even more evidence, they showed that when the pattern is broken the earnings multiple experiences a significant reduction as well. If a company reports a decrease in earnings for two consecutive years after an earlier trend of increases, the earlier benefits of a positive pattern in its valuation multiple disappear completely. Burgstahler & Dichev (1997) also included this in their study and found that 8 to 12 percent of companies with a small pre-managed earnings decrease took actions to adjust their earnings and show an increase. These figures along with the higher percentages mentioned earlier for managing a small loss into reporting a profit are also consistent with the hierarchy of importance presented by Degeorge et al (1999). They assumed the same reasons as those mentioned above for avoiding losses also result in this behaviour.

In some cases, market-based incentives may also cause firms to use downward earnings management. Two examples of this are to smoothen earnings downwards in the case of a very strong year, and secondly for a new executive to decrease earnings in their first year to then be able to report growing earnings in future years. DeFond and Park (1997) found that 92% of companies who they predicted to have an incentive to decrease earnings took such actions through discretionary accruals management. They explain that when earnings for the current period are relatively higher than what is expected for future periods, managers will smoothen earnings by shifting earnings to future years. The use of earnings management surrounding executive changes has been researched extensively, and most studies find large discretionary write-offs also described as the initial "earnings bath" during the first year of an executive's tenure (Pourciau 1993; Ali & Zheng 2015). The incentive behind this is to enable a new executive to report increasing earnings in future years and perhaps blame the first year's performance on the previous management.

2.2.2 Contractual incentives

While market-related incentives are central in the use of earnings management, contractual incentives such as those related to debt contracts and management compensation also impact such behaviour in a significant way. Healy and Wahlen (1999) explain that managers need to keep the interests of both their shareholders and creditors in balance, and for this reason most debt contracts include covenants which often restrict the level of risk managers can take. These covenants are typically financial ratios with requirements and limits within which they must stay. Violating a covenant can be costly and therefore managers of companies that are close to their covenant levels may be incentivised to use earning management.

DeFond and Jiambalvo (1994) researched firms who violated financial covenants and found that these firms had used significant amounts of discretionary accruals to improve earnings in the year prior to reporting the covenant violation. This is consistent with the common view that debt contract covenants incentivise earnings management. They also analysed the firms' behaviour during the year of violation and found evidence of some positive accruals, however noting that at this point it would no longer be beneficial to heavily manipulate earnings for the covenants' sake since the violation is already public. On the other hand, DeAngelo et al. (1994) argued that the decision by managers of financially distressed companies to use discretionary accruals is mostly a result of acknowledging the firm's financial distress, not to avoid debt covenants. In fact, their results show that troubled firms as a group show consistent large negative accruals, meaning they systematically decrease reported earnings even further. They speculate that these earnings management decisions could be caused by managers trying to highlight their firms' financial troubles and use that to gain better terms when renegotiations existing contracts.

Another aspect of contractual incentives includes internal management compensation contracts. Since it has such an obvious and direct connection to the earnings management decisions made within a company, this topic has been heavily researched over the past decades. Healy (1985) found that typical compensation contracts incentivise managers to make both income-increasing as well as income-decreasing adjustments, depending on the situation. While maximising earnings traditionally helps managers reach their compensation limits, there are also situations

where the opposite actions make sense. If a bonus contract has an upper limit, managers may be incentivised to decrease earnings in a good year and postpone them to the following year in order not to waste any of the bonus potential. Alternatively, if the contract has a lower limit and that limit is not reached in a bad year, managers may be incentivised to decrease earnings even further and thus increase the chances of earning a bonus in the following year.

Bergstresser and Philippon (2006) examined whether the significant rise in popularity of stock- and option-based compensation in the 1980's, 1990's and early 2000's resulted in a greater incentive for managers to manipulate reported earnings. The study found evidence that companies with higher rates of such CEO incentivization showed higher rates of earnings management. Furthermore, these CEO's exercised options and sold shares in unusually high volumes during years when their share of accruals to total reported earnings was high.

2.2.3 Other incentives

In addition to market-related and contractual incentives, there are also various other reasons which can motivate firms to engage in earnings management behaviour. Some benefit the company through ways such as enjoying the advantages of import relief, avoiding anti-trust investigations or influencing prices of acquisition. Others result in personal gain for managers, such as through stock ownership, career outlook or bonuses.

Jones (1991) researched the connection between the timing of import relief investigations and the earnings management activity of companies in specific industries. Import relief is used by governments to protect domestic producers from excessive competition and one of the criteria used when investigating possible target industries is the profitability of these industries. The relief may come in many forms, such as tariffs, subsidies, tax benefits or affordable financing. Naturally, companies whose industries receive favourable import relief decisions will benefit from it financially and may have incentives to use accounting decisions to improve their chances. The study found that companies did in fact engage in income-decreasing earnings management through accruals during the years of these investigations into their industries.

Another similar politically driven topic are antitrust investigations, where governments investigate whether certain companies have too much "market power" especially in situations such as mergers or acquisitions. Makar and Alam (1998) found that companies who are the subject of antitrust investigations in merger situations decrease their earnings in order to manage the potential cost of the political risk involved. In addition, those who reach a settlement regarding their case continue to use income-decreasing earnings management afterwards in case of subsequent situations.

Mergers and acquisitions often involve the use of stock as at least part of the payment, which means that managers may be able to make more affordable transactions if they can influence their firm's stock price in the short term. When a purchase price is agreed upon, the parties also agree on how many shares of the acquirer will the target company's shareholders receive in exchange for their existing shares. This means that the higher the acquirer's share price is, the fewer shares it must give in exchange for the target company, creating incentive for managers to manage earnings upwards. Several studies show that this theoretical phenomenon is real, for example Erickson and Wang (1999) found that companies managed their earnings upwards through positive accruals in the period prior to announcing a merger, and that such actions were more aggressive as the size of the deal increased. They then compared these results to mergers which were executed as cash offers and found that in those transactions such earnings management was not present, adding evidence to the link between earnings management and share for share purchases. Botsari and Meeks (2008) found similar evidence from the UK in 1997-2001, a period during which mergers were at record levels.

Managers also have incentives to manipulate earnings for their personal benefit, perhaps most commonly through equity ownership in their firm. Cheng and Warfield (2005) examined the connection between equity incentives and earnings management and explain that as a general guideline a manager's high equity ownership causes them to consider how this impacts the sensitivity of their total wealth. This is highlighted among those managers with heavy equity-based compensation plans as they tend to sell more of their shares compared to other managers. Since they sell more shares, they are also more conscious of share price volatility and thus more incentivised to take action to reduce those movements. Cheng and Warfield (2005) found

evidence that a higher managerial equity ownership results in more earnings management as well as a higher likelihood of the company meeting or just beating market expectations. As mentioned earlier, companies which do not achieve this are punished by the market resulting in negative price changes. They also found that these managers prefer smooth earnings and are less likely to report significant positive earnings surprises, rather reserving earnings and avoiding disappointments in subsequent periods.

2.3 Methods of measuring earnings management

Prior literature has proposed various models for measuring the extent of both accrual-based and real earnings managements. However, it is important to keep in mind that these are all only estimations and typically relevant with only large samples. They are based on assumptions since it is impossible to perfectly distinguish between warranted accounting adjustments or real operating decisions and similar actions taken with the main objective of manipulating reported numbers. Especially with recent literature suggesting somewhat of a shift away from accruals and more towards real earnings management through operations, companies may be capable of hiding these actions more effectively. After all, one of the reasons companies engage in earnings management is to mislead stakeholders, as mentioned by Healy and Wahlen (1999, p. 368), and therefore it should be expected that managers do their best to hide these actions.

The following two chapters will present some of the more common methods of measuring both accruals-based and real earnings management. The methods used in this thesis will be further expanded upon in Chapter 4.2.

2.3.1 Measuring accrual-based earnings management

A company's reported earnings compose of cash flows from operations and accounting accruals. Accruals on the other hand consist of non-discretionary and discretionary accruals, the latter being the component of earnings management. If no earnings management were to exists, total accruals would thus equal non-discretionary accruals. Therefore, when measuring accruals-

based earnings management, the process usually starts from total accruals and moves towards separating its two components, and ultimately identifying the amount of discretionary accruals.

Several models have been created over the years in order to accomplish this, of which some of the most prominent were analysed by Dechow et al. (1995) in a key study that has since become one central piece of earnings management literature. These models include ones put forth by Healy (1985), DeAngelo (1986), and Jones (1991), as well as a modification of the Jones model by Dechow et al. (1995) and the Industry Model by Dechow and Sloan (1991). These models are described below, however, to summarise the results by Dechow et al. (1995), they showed that all five models passed the analysis and that the modified Jones model was found to be the most effective in detecting accrual-based earnings management.

The model proposed by Healy (1985) is considered the first notable model introduced to earnings management literature. It is relatively simple, using the mean of total accruals scaled by lagged total assets and comparing them between three different sample groups. In one of them earnings are predicted to be manager upwards and in the other two groups they are predicted to be managed downwards. This model assumes that earnings management occurs in all periods, whereas most other models use an estimation period during which no systematic earnings management is assumed to exist, in order to fulfil the requirement of at least one estimated parameter.

The model by DeAngelo (1986) is similar to the Healy model, however it assumes no earnings management in the first period and uses that period's total accruals as a proxy for non-discretionary accruals. If choosing between these two models, Dechow et al. (1995) suggests that the decision be made depending on the qualities of non-discretionary accruals. The DeAngelo model is more appropriate if they follow a random walk, whereas the Healy model is suitable if they track more around a constant mean.

The Jones (1991) model is perhaps the most famous and widely used model for estimating accrual-based earnings management. It is a regression model which attempts to control for the changes which happen in a company's economic circumstances by utilising changes in revenue levels as well as property, plant and equipment as explanatory variables. Dechow et al. (1995)

argue that the assumption in the Jones model, that all revenues are non-discretionary, results in the removal of any earnings coming from revenues managed at the discretion of managers. As a result, they present a modified Jones model (Dechow et al. 1995) in which the change in revenues is adjusted for the change in receivables. Thus, it assumes all changes in credit sales to be a result of earnings management because this is considered easier than manipulating cash sales. This thesis uses the modified Jones model to estimate accrual-based earnings management, the model is presented in more depth in Chapter 4.2.

Lastly, the Industry Model by Dechow and Sloan (1991) assumes that companies within the same industry share similar non-discretionary accruals. Thus, it estimates firm-specific parameters by utilising the median value of total accruals within that industry. Since it relies on the similarity of companies, any large changes in non-discretionary accruals resulting from firm-specific circumstances rather than those on an industry-level will potentially impair results.

2.3.2 Measuring real earnings management

While accrual-based earnings management has been researched for decades and several models have been developed for its estimation as listed above, real earnings management is a more recent field of study and therefore has not yet seen as much methodological advancement. A majority of quantitative studies on real earnings management rely on a process outlined by Roychowdhury (2006) which uses models originally developed by Dechow et al. (1998) to estimate three real earnings management metrics: abnormal cash flow from operations, abnormal production costs, and abnormal discretionary expenses. Abnormal cash flow from operations and abnormal production costs are commonly referred to as sales manipulation and overproduction, respectively. These models provide an estimation of the normal level at which these metrics should be based on a firm's characteristics as well as its industry and year, which can then be compared to the actual reported level and thus used to derive the abnormal level of the metric. Since the process used by Roychowdhury (2006) is widely accepted and utilised in real earnings management research, this thesis also uses it for the measurement of sales manipulation and overproduction. The models and their details are further explained and presented in Chapter 4.2 alongside other research design choices.

3 Analyst coverage and earnings management behaviour

This chapter reviews relevant literature on analysts and their role in the capital market, specifically from a governance point of view to which earnings management is associated. First it looks at the general effect of analyst presence on firm activities, and then discusses prior research on the specific topic of this thesis, analyst coverage and earnings management.

3.1 The governance role of analysts

One of the key factors in researching the relationship between analyst coverage and earnings management is understanding the role of financial analysts in the capital market, especially from a governance point of view. Analysts are certainly considered to have an important role in improving the flow of information in markets. For example, Healy and Palepu (2001) explain in their literature review that analysts add value to markets especially through improved market efficiency, as firms with more following show a faster incorporation of reported financial information in stock prices.

As for the monitoring role, Chen et al. (2015) found evidence of notable managerial degradation as a result of a decrease in analyst coverage, including worse contribution of cash holdings to shareholder value, excess CEO compensation, as well as a greater likelihood of value-destroying acquisitions. They also highlight that these effects are more significant among firms with a lower baseline coverage, possibly implying that loss of monitoring in their case leads to a more substantial loss in oversight compared in firms with large followings. These findings relate to the idea of agency costs, and in a key article on the topic by Jensen and Meckling (1976) they discussed that specifically security analysts employed by various parties of the capital market should play a key role in the monitoring activities to limit and balance these deficiencies of the market mechanism.

Dyck et al. (2010) researched the detection of corporate fraud in major U.S. companies and determined what share of it comes from different players. They found that the detection is broadly divided and not in fact dominated by government oversight agencies. Instead, the group

with the highest share of externally discovered detections, in other words outside the management team and board, is employees (17%). Analyst were found to count for about 14% of cases which is a higher share than for example that of the media (13%), auditors (11%) or the SEC (7%). They also discuss the incentives for analysts to expose frauds or not, showing that such whistleblowing is more likely to come from successful analysts with little to worry about in terms of potential consequences from the object companies. Knyazeva (2017) also examined the role monitoring role of analysts and its effects, finding that the effect of analyst coverage on firm behaviour was similar to that of corporate governance, resulting in a broad range of benefits such as higher returns, better voluntary disclosure, and less earnings management.

Overall, prior literature on the governance role of analysts suggests that while their main responsibilities may be related to the distribution of information resulting in better market efficiency, significant signs of a secondary oversight role can also be found.

3.2 Prior research

The relationship between analyst coverage and earnings management has been discussed to some extent in prior literature. However, since the topic contains various aspects such as different types of earnings management and the effects of different economic environments, the depth of findings is not so substantial. Many of the earlier studies focus on accrual-based earnings management since it is considered easier to detect, and they also use mostly US data due to its ease of access and broad availability.

The prominent study on this topic is by Yu (2008) who directly studied the effect of analyst coverage on managers' earnings management behaviour. He used the modified Jones model to analyse 33,127 observations of discretionary accruals in the US from 1988 to 2002 and found that greater analyst coverage resulted in lower use of discretionary accruals. The results also showed that companies covered by analysts used less discretionary accruals than those not covered by analysts. As an additional aspect, the study considered how various analyst characteristics affect earnings management behaviour, finding that both analyst experience as well as belonging to a top brokerage resulted in lower absolute use of discretionary accruals by

managers. The study highlighted a potential endogeneity problem regarding the connection between analysts and management behaviour which affects all the studies on this topic, arguing that since analysts tend to focus on companies with better information environments, they may avoid companies engaging in aggressive earnings management. The effects of this would in turn appear as results similar to those found in the study. He addressed this by using two alternative variables which also affect analyst coverage, inclusion in the S&P 500 index and expected coverage based on change of brokerage size, which he found to result in similar associations with the use of earnings management.

Another study which used discretionary accruals was carried out by Degeorge et al. (2013), who took an international perspective and compared the link between analyst coverage and earnings management in countries with different levels of financial development. They used similar methods as Yu (2008) and a time range of 1994 to 2002 with a total of 65,799 observations from 21 different countries which were subsequently divided into three levels of financial development. The results showed that increased analyst coverage resulted in less accrual-based earnings management activity, but only in countries with high financial development. This evidence was not found in countries of either medium or low financial development, neither was any trend found between the three groups. For the purposes of this thesis, it is important to mention that Finland was one of these countries and was placed in the lowest level group. For Finland, they identified 203 firm-year observations, 69% of firms being covered by analysts, and a mean coverage of 5.9 analysts per firm. They recorded that Finnish companies under analyst coverage had earnings management activity of 6.2% of total assets while those not covered scored 4.5%, being the largest difference among all included countries.

Prior literature has revealed an increase in the use of real earnings management especially in the U.S. since the passing of SOX in 2002, making it a valuable part of modern research in this area. In a recent study, Sun and Liu (2016) examined the impact of analyst coverage on real earnings management, focusing on US companies from 1996 to 2006 with a sample of 9,086 observations. Using abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs as proxies for real earnings management, they found evidence of a positive association between analyst coverage and real earnings management. More

specifically, the results showed a positive association between analyst coverage and the use of both up- and downwards real earnings management. Looking at results for the three different methods separately, abnormal cash flows (sales manipulation) and abnormal production costs (overproduction) show more significant results while results for abnormal discretionary expenses are not as significant. These results are opposite of those found by Yu (2008) regarding accrual-based earnings management, perhaps indicating that managers remain under pressure to reach expectations and consider real earnings management to be more difficult to monitor and dispute.

If one wishes to establish a complete picture of earnings management behaviour, it makes sense to consider both accrual-based and real earnings management together. Sun (2009) used a simplified method to combine the two methods, calculating the ratio of absolute values of accruals to absolute value of cash flows from operations. He applied this in order to find how the connection between analyst coverage and earnings management varies in countries based on their investor protection. The sample included 47,999 observations from 23 countries between 1990 and 2007. Unfortunately for this thesis, Finland was not one of those countries. The results highlight an increasingly negative association between analyst coverage and earnings management when moving towards weaker investor protection, suggesting that analysts' governance role is more important in countries with weaker investor protection.

There are not many studies which measure both earnings management methods as well as monitor their use in different situations alone and in connection to each other. However, Irani and Oesch (2016) attempted to do so among US companies from 1994 to 2015 but focused only on a specific subset of the available data in order to avoid the potential causality problem also referred to by Yu (2008). They utilised data on 13 brokerage mergers, as these often result in letting go of some analysts, to minimise the impact of analyst coverage changes caused by factors other than actual firm circumstances, resulting in a sample of 1,266 observations. The results show a decrease in real earnings management when a firm's analyst coverage decreases, mostly coming from abnormal discretionary expenses such as R&D. They also found that firms simultaneously increase their accrual-based earnings management when losing coverage,

similar to the results from Graham et al. (2005) mentioned earlier regarding their preference while under scrutiny by stakeholders such as auditors or analysts.

Another study which considered both methods of earnings management was performed by Hong et al. (2014) using 32,000 firm-year observations of U.S. data from 1989 to 2010. They focused heavily on the causality question using two effects both separately and jointly. The first is the monitoring effect that analyst coverage has on firms' earnings management use, and the second is the information effect that earnings management use has on analysts' willingness to follow a firm. They found that there is a simultaneous effect in both, as analyst following reduces earnings management while analysts also tend to follow companies with less earnings management. According to their analysis, these effects are jointly determined and not based on only one of the two. Using discretionary accruals for accrual-based earnings management and sales manipulation for real earnings management, they found both to be reduced by higher analyst coverage. They also found that higher levels of both methods have a significant negative information effect on analysts choosing to cover a firm. Additionally, they looked at the effect of the passing of SOX in 2002 and found that the information effect was present during the entire study period while the monitoring effect increased after 2002.

4 Research design

The previous chapters introduced the theoretical framework upon which the topic of this thesis is based. Next, the thesis transitions to the empirical part, beginning with research design. It includes discussion and development of the research hypotheses, an introduction of the key methodology chosen for the empirical research, and explanations of the data collection process as well as descriptions of the key data points.

4.1 Hypothesis development

This study will test two hypotheses which have been defined based on the prior literature discussed in Chapter 3.2. The literature covers both accrual-based and real earnings management and offers mostly uniform conclusions for each method. However, the prior research has focused heavily on the United States and is mostly based on data from earlier time periods. Therefore, there is a possibility that those results are not comparable to this thesis which is limited to Finnish listed companies from years 2005 to 2018. Also, there is evidence that Finland may not be a market where these associations are present, which along with the lack of research increases the need to study this topic among Finnish firms (Degeorge et al. 2013).

Accrual-based earnings management is measured in this thesis by discretionary accrual use as the evidence from prior literature on its connection to analyst coverage is rather solid. Most studies, notably Yu (2008), show that they are negatively associated and such more coverage results in less use. But there are also studies which raise questions as to the applicability of these results to Finnish firms. As mentioned above, Degeorge et al. (2013) found that this association does not apply to countries that are at Finland's level of financial development. In fact, the study shows that Finnish firms with no coverage used discretionary accruals less than those with coverage, proposing rather a positive association. Though this is not based on multivariate analysis, only averages, and therefore it is necessary to include other factors that may also influence the use of earnings management. All in all, the evidence supporting a negative association can be considered substantial, and therefore the first hypothesis is defined as:

H1: Analyst coverage is negatively associated with the use of discretionary accruals

The research on analyst coverage and real earnings management is not quite as comprehensive and does not include findings with regards to Finnish firms. Nonetheless, the results from the available, mostly U.S. based, studies are consistent and suggest a positive association. Therefore, this thesis uses sales manipulation and overproduction as proxies for real earnings management, and some evidence of a positive association has been found for both methods (Sun & Liu 2016). Based on the available framework, the second hypothesis is defined as:

H2: Analyst coverage is positively associated with the use of sales manipulation and overproduction

The first hypothesis can be seen as supporting the "monitoring" argument based on which analyst presence keeps managers away from manipulation, while the second hypothesis is in line with the "pressure" argument according to which the pressure to achieve analyst expectations steers managers toward manipulative actions. For a broad and deep enough view of the phenomenon, this thesis will examine the above hypotheses from various angles. It will look at analyst coverage as a characteristic of coverage versus no coverage, monitor different levels of coverage, as well as use several methods to measure the effects of changes in coverage.

4.2 Methodology

The methodology used in this thesis consists of two parts: estimation models used to form estimates of the use of the three earnings management methods, and regression models used to determine the relationship between earnings management and analyst coverage in the selected sample. This chapter introduces the models and methods chosen to be used in this thesis in more depth.

4.2.1 Estimation models for earnings management

The three earnings management metrics used in this thesis are discretionary accruals, sales manipulation and overproduction. Discretionary accruals are the discretionary portion of all

accrual adjustments available to be used by managers, sales manipulation refers to abnormal cash flows from operations, and overproduction means abnormal production costs. Below are the estimation models used to measure these metrics.

Accrual-based earnings management is estimated through discretionary accruals using the modified Jones model (Dechow et al. 1995) which gives the non-discretionary portion of total accruals. The model assumes that non-discretionary accruals are constant and therefore changes in accruals between periods are due to discretionary accruals. To reflect the changes in the firm and its environment between periods, the model uses the change in revenues adjusted by receivables and the change in gross property, plant and equipment. This model is chosen over the original Jones model (Jones 1991) because it controls for the changes in credit sales, which Dechow et al. (1995) argue are easier to manipulate than cash sales, resulting in a more reliable benchmark for accrual-based earnings management. To arrive at the discretionary portion, one must first establish total accruals for which Dechow et al. (1995) advise the following formula:

$$TA_t = (\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t) \quad (1)$$

where

TA_t = total accruals in year t

ΔCA_t = change in current assets in year t

ΔCL_t = change in current liabilities in year t

$\Delta Cash_t$ = change in cash and cash equivalents in year t

ΔSTD_t = change in debt included in current liabilities in year t

Dep_t = depreciation and amortization expense in year t

The modified Jones model (Dechow et al. 1995) for non-discretionary accruals is:

$$\frac{TA_t}{A_{t-1}} = \alpha_1 \left(\frac{1}{A_{t-1}}\right) + \alpha_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}\right) + \alpha_3 \left(\frac{PPE_t}{A_{t-1}}\right) + \varepsilon_t \quad (2)$$

where

A_{t-1} = total assets in year t-1 (or lagged total assets)

ΔREV_t = change in revenues in year t

ΔREC_t = change in receivables in year t

PPE_t = gross property, plant and equipment in year t

ε_t = error term

Once the two estimations above are available, discretionary accruals can be derived as the difference between total accruals and the non-discretionary portion accruals. The coefficients in the modified Jones model and in the models for sales manipulation and overproduction are all estimated separately for each top-level ICB industry code for greater accuracy.

Sales manipulation is estimated by following Roychowdhury's (2006) process of using a model for normal cash flows from operations developed by Dechow et al. (1998). The model is:

$$\frac{CFO_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{S_t}{A_{t-1}} + \alpha_3 \frac{\Delta S_t}{A_{t-1}} + \varepsilon_t \quad (3)$$

where

CFO_t = cash flows from operations in year t

S_t = sales in year t

ΔS_t = change in sales in year t

The value for sales manipulation or abnormal operating cash flows is considered the difference between reported operating cash flows and normal operating cash flows derived from the model above.

Overproduction is also estimated by following Roychowdhury's (2006) process of using models developed by Dechow et al. (1998). It assumes normal production costs as:

$$PROD_t = COGS_t + \Delta INV_t \quad (4)$$

where

$PROD_t$ = production costs in year t

$COGS_t$ = cost of goods sold in year t

ΔINV_t = change in inventory in year t

The two models by Dechow et al. (1998) for normal COGS and normal inventory growth are:

$$\frac{COGS_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{S_t}{A_{t-1}} + \varepsilon_t \quad (5)$$

$$\frac{\Delta INV_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta S_t}{A_{t-1}} + \alpha_3 \frac{\Delta S_{t-1}}{A_{t-1}} + \varepsilon_t \quad (6)$$

where

ΔS_{t-1} = change in sales in year t-1

By combining the two models for normal COGS (5) and normal inventory growth (6) according to the equation for assumed normal production costs (4), a final model can be defined:

$$\frac{PROD_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{S_t}{A_{t-1}} + \alpha_3 \frac{\Delta S_t}{A_{t-1}} + \alpha_4 \frac{\Delta S_{t-1}}{A_{t-1}} + \varepsilon_t \quad (7)$$

The value for overproduction or abnormal production costs is considered the difference between reported production costs and normal production costs derived from the model above.

In addition to discretionary accruals (*DA*), sales manipulation (*SM*), and overproduction (*OP*), I also use the sum of these three to represent total earnings management use (*EM*):

$$\frac{EM}{A_{t-1}} = \frac{DA}{A_{t-1}} + \frac{SM}{A_{t-1}} + \frac{OP}{A_{t-1}} \quad (8)$$

In this thesis, measuring total earnings management can be used to monitor the total use of these methods in relation to analyst coverage. It is also useful because it may shed light on how the three methods are used in relation to each other. For example, if results show associations between coverage and the three methods but total earnings management use in not related, it may suggest that firms only alternate between these different options while reacting to coverage changes but the total amount of earnings manipulation remains roughly the same.

4.2.2 Regression models

The primary method used in this thesis to estimate the relationship between analyst coverage and earnings management use is an OLS regression. The basic structure of the OLS regression is:

$$|EarningsManagement| = \beta_0 + \beta_1 Coverage + \beta_2 Controls + YearFixed + IndustryFixed + \epsilon$$

where *EarningsManagement* refers to the proxy of earnings management and *Coverage* to the proxy of analyst coverage being used for that specific test. These proxies are explained in detail in Chapter 5.2 where the various regression results are shared. *Controls* is a vector of the control variables used in all regressions, their selection and qualities are further expanded upon in Chapter 4.3 along with other data-related disclosures. *YearFixed* and *IndustryFixed* refer to year and industry fixed effects which are used in all regressions.

However, the OLS regression is not flawless because it does not control for the potential endogeneity between analyst coverage and earnings management. It is possible that if analyst coverage impacts a firm's earnings management behaviour, then a firm's earnings management behaviour may also impact an analyst's decision to follow that firm. For example, Hong et al. (2014) found evidence that the two are simultaneously determined and thus analysts tend to follow firms that use less earnings management. To address this issue, I use a two-stage least squares (2SLS) regression which utilises an instrumental variable that captures the exogenous variation in analyst coverage. The 2SLS results can then be compared to the OLS results for confirmation of their validity. This method is not used for tests that involve measuring the effects of change in coverage, whether numerical or directional, because the change analysis already incorporates the effect of time as a sort of instrument and thus the additional benefit of a 2SLS regression is limited.

Yu (2008) and others have implemented the 2SLS test using an instrumental variable for expected coverage which is based on the change in brokerage house sizes over time. They use expected coverage to capture the variation in a firm's analyst coverage which is not linked to its earnings management use but to the changes in the number of analysts employed by the brokerage firms that follow it. Unfortunately, I do not have such specific brokerage house data available, but I am able to construct a similar variable using market-wide analyst coverage data. This modification of expected coverage is based on the change in the market-wide average of analyst coverage between observation year *t* and benchmark year 0. This is then multiplied by

a firm's coverage in benchmark year 0 to arrive at its expected coverage in observation year *t*. The equation is:

$$ExpectedCoverage_{it} = (MarketCoverage_t / MarketCoverage_0) * Coverage_{i0}$$

where $ExpectedCoverage_{it}$ is the expected coverage of firm *i* in year *t*, *MarketCoverage* is the market-wide average of analyst coverage per covered firm and $Coverage_{io}$ is the analyst coverage of firm *i* in year 0. The benchmark year used here is 2011 because it is in the middle of the sample period, but more importantly because it provides the largest generatable sample size for expected coverage (1316 observations). Firms with zero coverage in the benchmark year are excluded as the equation does not facilitate their use. This modification of expected coverage assumes that any changes in the average analyst following among all covered firms is a result of increased or decreased analyst activity in the marketplace. Thus, it can be used to capture the variation in a firm's analyst coverage that is caused by change in overall analyst activity within the marketplace and which is exogenous to that firm's earnings management use. Using expected coverage as the instrumental variable in the 2SLS regressions, the two stages are:

$$\widehat{Coverage} = \gamma_0 + \gamma_1 ExpectedCoverage + \gamma_2 Controls + YearFixed + IndustryFixed + \epsilon$$

$$|EarningsManagement| = \beta_0 + \beta_1 \widehat{Coverage} + \beta_2 Controls + YearFixed + IndustryFixed + \epsilon$$

4.3 Data

The empirical research in this thesis is based on two primary data points: analyst coverage data and financial data to measure earnings management. The data for analyst coverage is gathered from the IBES (Institutional Brokers' Estimate System) database, using the quantity of full-year EPS estimates. The financial data for measuring all three forms of earnings management is collected from the Thomson Reuters Eikon database, the Orbis databases and in some cases manually from annual reports when data is not available in the databases.

The original sample consists of 1875 firm-year observations from a period of 2005 to 2018. After removing ineligible financial firms such as banks and insurance companies (ICB codes 8300-8500) as well as observations with incomplete data, and winsorizing the remaining data at 0.5% and 95.5% to remove outliers, the final sample size is 1640 firm-year observations. Of these, 1567 have data for discretionary accruals (*DA*), 1622 for sales manipulation (*SM*), 1280 for overproduction (*OP*), and 1251 for total earnings management (*EM*) which is simply the combination of the three methods. More specific industry and year distributions of each sub-sample can be viewed in Appendix 1.

Due to the wide variety in analyst coverage levels among firms, rather than using the raw number of analysts coverage this variable is measured on a logarithmic scale, by adding one to each analyst count and obtaining the natural logarithm of that value. This modification is especially valuable when researching the effects of change in coverage, as it analyses the data more in terms of ratios than differences which offers more equivalent values between firms on different ends of the coverage distribution. The logarithm of coverage is used in all regressions that utilise number of analysts as a variable, and it is also used on the expected coverage variable when running 2SLS tests.

A value for earnings management is present as the dependant variable in all the regressions in this study. Even though the methods can be used to both increase and decrease a firm's reported earnings, its role as a variable here is to show how much earnings management is being used. For this reason, the variables for earnings management are in all cases absolute values. When measuring change in earnings management, the value used is the change in the absolute value, meaning how the level of use has changed regardless of whether it is used to increase or decrease earnings. However, it may be important to also observe in which directions firms use earnings management, especially if it is heavily lopsided. For this reason, the regression results are presented in three groups: all firms, firms with positive or upwards management, and firms with negative or downwards management. As mentioned in the theoretical framework, firms have various incentives to manage earnings in both directions and presenting the results in this way can be used to monitor whether there is evidence of an uneven distribution.

There are five control variables used in this study, along with industry and year fixed effects. These variables are firm characteristics which may also impact earnings management and hence their effects are being controlled for. Market to book ratio is used to differentiate between growth and value firms, calculated as market value divided by total equity. Return on assets portrays profitability and is gathered from the Eikon database. Growth rate of assets is the change of total assets divided by lagged total assets, a measure of a firm's growth rate. Cash flow volatility is the standard deviation of a firm's cash flows over the entire sample period scaled by lagged total assets, representing a firm's operational volatility during the sample period. Finally, leverage is total liabilities divided by total equity. Market value is used in the descriptive statistics due to its significance is describing the samples, however it is not used in the regressions due to a high degree of multicollinearity.

Some of the tests involve measuring the effect of change in analyst coverage. In these tests the control variables are also used in the form of change between the observation and benchmark years rather than as values from the observation year. While there may be an argument for both, I have deemed the change more relevant in this context. I believe that using the change value offers the regression more data on what happened during the period of change, resulting in a more informed estimation of the effect of change in analyst coverage.

5 Empirical results

This chapter presents the findings of this study. It begins with descriptive statistics and correlation structures for the basic characteristics of the key variables, then transitions into the tests and shares their results. The tests are divided into three sections: comparing covered versus uncovered firms, measuring the impact of the level of coverage, and measuring the effects of three different types of change in coverage. More extensive discussion of these results and their implications will take place in Chapter 6.

5.1 Descriptive statistics

Table 1 shows the descriptive statistics for each of the three sub-samples: discretionary accruals, sales manipulation, and overproduction. Sales manipulation has the highest firm-year observation count (1622), followed by discretionary accruals (1567) and overproduction (1280). The sub-samples are not the same size due to the different data points used to estimate the use of these methods, as well as industrial variation which can be seen more clearly in Appendix 1. All earnings management figures are presented as scaled by lagged total assets, according to the formulas utilised and described earlier in Chapter 4.2. The average company is covered by between 4 and 5 analysts and its market value is between 175 and 249 million euros, depending on the sample. Firms in the overproduction sub-sample are larger and use slightly more leverage than firms in the other samples. Overproduction is also used approximately three times as heavily as discretionary accruals and sales manipulation when scaled by total lagged assets.

Table 2 describes the correlation structure of the key variables used in the regressions. It shows that the number of analysts covering a firm is negatively correlated with the absolute values of each of the earnings management metrics, overproduction less than the others. This study uses analyst coverage on a logarithmic scale. Expected coverage, the instrumental variable used in the 2SLS regressions and on a logarithmic scale, is highly correlated with actual analyst coverage but its correlations with the earnings management metrics are lower than those of actual coverage. Market value is only used to describe the samples and not as a control variable in regressions due to a high degree of multicollinearity.

Table 1. Descriptive statistics for the three sub-samples

This table describes the characteristics of the three sub-samples. Q1 and Q3 refer to values at the first and third quartile, respectively.

Discretionary accruals	N	Q1	Mean	Median	Q3	St. dev.
Discretionary accruals	1567	-0.051	-0.011	-0.008	0.027	0.08
Discretionary accruals, absolute	1567	0.017	0.058	0.040	0.076	0.06
Number of analysts	1567	1.00	6.71	4.00	10.00	7.60
Market value (EUR million)	1567	40	1547	185	845	5224
Market-book ratio	1567	1.06	2.25	1.70	2.92	11.78
Return on assets	1567	0.15	2.22	4.01	7.90	15.14
Growth rate of assets	1567	-0.05	0.09	0.02	0.12	0.46
Cash flow volatility	1567	0.03	0.08	0.06	0.09	0.09
Leverage	1567	0.76	1.57	1.24	1.80	10.52
Sales manipulation	N	Q1	Mean	Median	Q3	St. dev.
Sales manipulation	1622	-0.038	0.008	0.009	0.058	0.10
Sales manipulation, absolute	1622	0.021	0.069	0.048	0.097	0.07
Number of analysts	1622	1.00	6.59	4.00	10.00	7.56
Market value (EUR million)	1622	39	1502	175	810	5141
Market-book ratio	1622	1.05	2.39	1.70	2.88	8.74
Return on assets	1622	0.21	2.71	4.04	7.96	13.57
Growth rate of assets	1622	-0.05	0.10	0.02	0.12	0.47
Cash flow volatility	1622	0.03	0.08	0.06	0.09	0.09
Leverage	1622	0.75	1.60	1.23	1.81	10.14
Overproduction	N	Q1	Mean	Median	Q3	St. dev.
Overproduction	1280	-0.176	-0.029	-0.046	0.113	0.25
Overproduction, absolute	1280	0.072	0.191	0.148	0.264	0.16
Number of analysts	1280	1.00	7.53	5.00	11.00	7.86
Market value (EUR million)	1280	52	1849	249	1135	5734
Market-book ratio	1280	1.07	2.20	1.72	2.80	2.44
Return on assets	1280	0.42	2.94	4.04	7.86	13.63
Growth rate of assets	1280	-0.05	0.06	0.02	0.10	0.31
Cash flow volatility	1280	0.03	0.08	0.05	0.09	0.08
Leverage	1280	0.85	1.46	1.32	1.90	3.57

Table 2. Correlation structure of key variables for the three sub-samples

	Discretionary accruals	1	2	3	4	5	6	7	8	9
1	Number of analysts (log)	1.000								
2	Discretionary accruals, absolute	-0.202	1.000							
3	Discretionary accruals	-0.018	-0.104	1.000						
4	Market-book ratio	0.016	0.038	0.060	1.000					
5	Return on assets	0.214	-0.193	0.114	0.071	1.000				
6	Growth rate of assets	-0.053	0.199	0.014	0.043	0.053	1.000			
7	Cash flow volatility	-0.354	0.255	0.051	0.059	-0.244	0.349	1.000		
8	Leverage	0.000	0.044	0.067	0.838	-0.006	0.019	0.058	1.000	
9	Expected coverage (log)	0.930	-0.171	-0.003	-0.009	0.243	-0.028	-0.288	-0.028	1.000
	Sales manipulation	1	2	3	4	5	6	7	8	9
1	Number of analysts (log)	1.000								
2	Sales manipulation, absolute	-0.177	1.000							
3	Sales manipulation	0.072	-0.027	1.000						
4	Market-book ratio	0.008	0.095	-0.017	1.000					
5	Return on assets	0.209	-0.103	0.368	0.031	1.000				
6	Growth rate of assets	-0.077	0.209	-0.084	0.027	0.052	1.000			
7	Cash flow volatility	-0.359	0.349	-0.083	0.099	-0.136	0.326	1.000		
8	Leverage	-0.003	0.024	-0.085	0.956	-0.025	0.018	0.065	1.000	
9	Expected coverage (log)	0.927	-0.147	0.095	-0.005	0.223	-0.020	-0.304	-0.027	1.000
	Overproduction	1	2	3	4	5	6	7	8	9
1	Number of analysts (log)	1.000								
2	Overproduction, absolute	-0.092	1.000							
3	Overproduction	0.081	-0.049	1.000						
4	Market-book ratio	0.123	0.094	-0.083	1.000					
5	Return on assets	0.211	0.095	-0.086	0.228	1.000				
6	Growth rate of assets	-0.025	0.162	0.042	0.084	0.042	1.000			
7	Cash flow volatility	-0.344	0.054	-0.022	0.081	-0.146	0.256	1.000		
8	Leverage	0.027	-0.014	0.021	0.526	0.008	0.013	-0.038	1.000	
9	Expected coverage (log)	0.932	-0.071	0.103	0.123	0.197	0.011	-0.254	0.022	1.000

Table 3 shows how the descriptive statistics vary between different levels of analyst coverage. This study uses the absolute values of earnings management in regressions since the main purpose is to study the extent of use rather than direction. For use of discretionary accruals, there is a downward trend as coverage increases. A similar but weaker trend is visible for sales manipulation, while overproduction shows a slight upward trend until coverage surpasses 10 analysts, at which point its use drops significantly. Firms with more coverage are generally larger and they also show higher returns on assets.

Table 3. Descriptive statistics of sub-samples based on the level of analyst coverage

This table describes the sub-samples based on size of analyst coverage. It divides each sample into groups by their size of coverage and presents medians and means of absolute use of the respective earnings management method, market value, and return on assets for each group along with the size of the group.

		Discretionary accruals (DA)				Sales manipulation (SM)				Overproduction (OP)			
Coverage (analysts)		Abs_DA	Market value	ROA	N (1567)	Abs_SM	Market value	ROA	N (1622)	Abs_OP	Market value	ROA	N (1280)
0	Median	0.056	20.8	2.62	260	0.054	20.5	2.64	271	0.140	20.3	2.59	170
	Mean	0.078	48.7	-3.49		0.084	47.5	-2.27		0.181	47.7	-1.96	
> 0	Median	0.038	294.7	4.16	1307	0.046	271.6	4.22	1351	0.152	366.2	4.22	1110
	Mean	0.054	1844.9	3.36		0.066	1793.6	3.70		0.193	2124.9	3.69	
1	Median	0.051	26.0	1.56	226	0.056	28.3	2.14	249	0.169	28.1	1.53	167
	Mean	0.074	60.4	-1.82		0.079	59.8	-0.63		0.213	67.8	-1.67	
2-5	Median	0.037	123.3	4.43	431	0.052	119.4	4.43	441	0.169	126.8	3.89	339
	Mean	0.056	488.6	3.45		0.071	479.7	3.83		0.214	571.3	3.29	
6-10	Median	0.038	423.8	4.66	279	0.051	422.7	4.66	285	0.180	445.8	4.66	253
	Mean	0.050	946.8	4.51		0.070	934.4	4.84		0.213	1015.4	5.01	
> 10	Median	0.033	2127.2	4.63	371	0.033	2119.7	4.64	376	0.119	2348.9	4.77	351
	Mean	0.043	5183.1	5.54		0.049	5133.9	5.55		0.148	5403.8	5.67	

5.2 Analyst coverage and earnings management use

The results in this chapter focus on how the quantity of analyst coverage affects a company's use of earnings management. The analysis is divided into three parts, first looking at a simple division between covered and uncovered firms, then using the actual level of coverage for more specific insight, and finally examining the effects of change in the level of coverage. Regression results for covered versus uncovered firms, level of coverage, and numeric change in coverage are estimated using three categories: all firms, firms with positive or upwards earnings management, and firms with negative or downwards earnings management. This is done in order to identify whether the results for all firms are being distorted by either one of the directions perhaps due to the various incentives described earlier in Chapter 2.2.

As mentioned earlier, I have also added an additional proxy to the regressions which represents total earnings management. This is the sum of discretionary accruals, sales manipulation and overproduction, and reflects a firm's total use of earnings management at least to the extent of the metrics measured in this study. This offers an additional fourth measure which can be used

to better understand the earnings management use. It may also offer some supplementary information on the use of the three methods in relation to each other.

5.2.1 Covered versus uncovered firms

The first part of analysis looks at how the earnings management behaviour of firms varies depending on whether a company is or is not followed by analysts. Using a dummy variable for coverage, 1 for covered and 0 for uncovered, the OLS results in Table 4 show that covered firms exhibit lower use of discretionary accruals compared to uncovered firms. The result is reflected in firms with both positive and negative discretionary accruals, suggesting that it is a balance effect. Overall, firms with coverage use more overproduction than those without coverage however there is a severe divide between firms with positive and negative overproduction. Firms with positive overproduction use it less, whereas those with negative overproduction use it more. The use of sales manipulation as well as the total earnings management from all three methods combined do not present significant results with regards to having coverage or not. By comparing the regression results to the median (mean) values of discretionary accruals and overproduction in the summary statistics, it can be derived that covered firms use approximately 40% (28%) less discretionary accruals and 20% (15%) more overproduction than uncovered firms. Overall, being covered by analysts appears to have a significant effect on which methods of earnings management firms prefer to use.

Next, I use the 2SLS test with expected coverage presented earlier in Chapter 4.2.2 to address the possible endogeneity between analyst coverage and earnings management. Comparing the significant OLS results to corresponding 2SLS coefficients in Table 5 shows that their signs are consistent, with one exception being firms who decreased earnings through overproduction. The result for discretionary accruals is significant and negative also in the 2SLS regression, also suggesting robust results. Interestingly, sales manipulation shows significant results in the 2SLS regression that are not present in the OLS regression, for both positive and negative use with opposite directions of effect.

Table 4. Covered versus uncovered firms, OLS regression results

The dependent variables are the absolute values of the respective earnings management metrics. The coverage dummy is 0 for uncovered firms and 1 for covered firms. Positive and negative refer to firms with either positive or negative earnings management. T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

	Discretionary accruals (DA)			Sales manipulation (SM)			Overproduction (OP)			Earnings management (EM)		
	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative
Intercept	0.020	0.016	0.018	0.033**	0.042**	-0.012	0.017	0.072	-0.025	0.066	0.054	0.048
	(1.26)	(0.72)	(0.85)	(2.03)	(2.03)	(-0.50)	(0.40)	(1.19)	(-0.45)	(1.29)	(0.67)	(0.69)
Coverage dummy	-0.016***	-0.014**	-0.012**	0.002	-0.004	0.009	0.029**	-0.047**	0.047***	0.011	0.004	0.002
	(-3.67)	(-2.23)	(-2.13)	(0.53)	(-0.72)	(1.35)	(2.21)	(-2.10)	(2.92)	(0.71)	(0.13)	(0.12)
Market to book ratio	0.000	-0.001	0.000	0.006***	0.010***	0.001	0.003	-0.005	0.013***	0.010***	-0.001	0.023***
	(0.44)	(-0.92)	(1.44)	(8.98)	(9.62)	(0.69)	(1.14)	(-1.54)	(3.94)	(3.36)	(-0.21)	(5.79)
Return on assets	-0.001***	-0.000**	-0.001***	-0.001***	0.000	-0.002***	0.001**	0.001***	-0.000	-0.001	-0.000	-0.001
	(-6.24)	(-2.12)	(-7.31)	(-4.58)	(1.13)	(-8.91)	(2.17)	(2.78)	(-0.23)	(-1.38)	(-0.29)	(-1.24)
Growth rate of assets	0.023***	0.056***	0.019***	0.018***	0.014***	0.023***	0.072***	0.097***	0.064***	0.142***	0.196***	0.087***
	(6.68)	(7.88)	(4.51)	(5.08)	(2.59)	(4.87)	(5.03)	(4.91)	(3.06)	(6.78)	(6.74)	(2.76)
Cash flow volatility	0.089***	0.179***	0.017	0.186***	0.155***	0.188***	0.018	-0.148	0.074	0.251***	0.226	0.270***
	(4.42)	(6.22)	(0.58)	(9.29)	(6.30)	(5.94)	(0.32)	(-1.48)	(1.11)	(3.48)	(1.53)	(3.30)
Leverage	0.000	0.001	-0.001	-0.005***	-0.006***	-0.001	-0.001	0.002	-0.005***	-0.005***	0.002	-0.011***
	(0.50)	(1.13)	(-1.32)	(-8.84)	(-9.40)	(-0.63)	(-1.01)	(0.88)	(-3.12)	(-2.97)	(0.53)	(-5.34)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	1567	686	881	1622	893	729	1280	523	757	1251	534	717
Adjusted R^2	0.132	0.195	0.144	0.228	0.258	0.300	0.188	0.314	0.187	0.221	0.255	0.232

Table 5. Covered and uncovered firms, 2SLS regression results

The dependent variables are the absolute values of the respective earnings management metrics. The instrumental variable is expected coverage on a logarithmic scale. The coverage dummy is 0 for uncovered firms and 1 for covered firms. Positive and negative refer to firms with either positive or negative earnings management. T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

	Discretionary accruals (DA)			Sales manipulation (SM)			Overproduction (OP)			Earnings management (EM)		
	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative
Intercept	0.074***	0.028	0.105***	0.040***	0.062***	-0.017	0.232***	0.437***	0.163***	0.315***	0.477***	0.244***
	(5.34)	(1.51)	(5.26)	(2.84)	(4.14)	(-0.61)	(5.33)	(5.59)	(3.37)	(6.04)	(5.44)	(4.03)
Coverage dummy	-0.023*	-0.013	-0.041**	-0.006	-0.038***	0.043*	0.028	-0.003	-0.009	0.009	0.006	-0.035
	(-1.85)	(-0.83)	(-2.08)	(-0.45)	(-2.65)	(1.70)	(0.73)	(-0.04)	(-0.20)	(0.20)	(0.09)	(-0.61)
Market to book ratio	-0.000	-0.002	0.002	0.005***	0.011***	-0.003**	0.003	-0.008**	0.017***	0.007**	-0.008	0.026***
	(-0.32)	(-1.2)	(1.36)	(6.46)	(9.25)	(-2.32)	(1.06)	(-2.18)	(4.60)	(2.23)	(-1.59)	(6.11)
Return on assets	-0.001***	-0.000	-0.001***	-0.000***	0.000	-0.002***	0.000	0.001	-0.000	-0.000	0.000	-0.001
	(-5.12)	(-1.23)	(-5.37)	(-3.02)	(0.94)	(-7.72)	(0.79)	(0.63)	(-0.13)	(-0.52)	(-0.00)	(-0.69)
Growth rate of assets	0.009**	0.050***	0.007	0.009*	0.009	0.016**	0.079***	0.105***	0.048	0.113***	0.149***	0.065
	(2.29)	(6.48)	(1.32)	(1.18)	(1.43)	(2.15)	(4.32)	(4.61)	(1.59)	(4.83)	(4.96)	(1.65)
Cash flow volatility	0.228***	0.375***	0.149***	0.277***	0.228***	0.339***	-0.016	-0.145	0.078	0.629***	0.510**	0.784***
	(7.14)	(8.36)	(3.30)	(9.35)	(6.05)	(7.38)	(-0.17)	(-0.96)	(0.62)	(4.79)	(2.02)	(5.25)
Leverage	0.000	0.001	0.001	-0.004***	-0.005***	0.003**	-0.004	0.004	-0.009***	-0.004	0.004	-0.014***
	(0.59)	(1.21)	(1.10)	(-6.39)	(-4.79)	(2.19)	(-1.60)	(1.20)	(-3.01)	(-1.37)	(0.85)	(-3.89)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	1283	566	717	1311	735	576	1120	447	673	1102	469	633
Adjusted R^2	0.176	0.289	0.160	0.247	0.298	0.311	0.166	0.320	0.159	0.225	0.262	0.264

5.2.2 Level of analyst coverage

The second part of analysis examines how the level of analyst coverage affects earnings management use. It measures analyst coverage by the number of analysts covering a firm in a specific year on a logarithmic scale. The OLS results in Table 6 show that analyst coverage and the use of discretionary accruals have a significant negative association, meaning greater coverage is linked to less use of discretionary accruals. The use of other methods or the combined level of earnings management do not show significant results, only in some of the sub-samples for either positive or negative use. Some of the other variables used in the regression also show significant relations to overall earnings management use. Higher valuation, growth rate, and cash flow volatility appear to indicate a higher level of earnings management across the board, whereas higher leverage shows a negative association.

Table 6. Level of analyst coverage, OLS regression results

The dependent variables are the absolute values of the respective earnings management metrics. Analyst coverage is a firm's analyst following on a logarithmic scale. Positive and negative refer to firms with either positive or negative earnings management use. T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

	Discretionary accruals (DA)			Sales manipulation (SM)			Overproduction (OP)			Earnings management (EM)		
	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative
Intercept	0.029*	0.020	0.032	0.042**	0.054***	-0.007	0.043	0.065	0.017	0.104**	0.079	0.097
	(1.79)	(0.86)	(1.46)	(2.50)	(2.61)	(-0.25)	(1.02)	(1.05)	(0.30)	(1.98)	(0.99)	(1.36)
Analyst coverage	-0.008***	-0.006**	-0.008***	-0.002	-0.005**	0.001	0.000	-0.012*	-0.000	-0.008	-0.006	-0.016**
	(-4.54)	(-2.23)	(-3.51)	(-1.11)	(-2.54)	(0.38)	(0.06)	(-1.70)	(-0.04)	(-1.40)	(-0.68)	(-2.07)
Market to book ratio	0.000	-0.001	0.000	0.006***	0.010***	0.001	0.003	-0.005	0.014***	0.011***	-0.000	0.025***
	(0.63)	(-0.78)	(1.55)	(9.06)	(9.97)	(0.68)	(1.44)	(-1.50)	(4.41)	(3.67)	(-0.07)	(6.20)
Return on assets	-0.001***	-0.000**	-0.001***	-0.001***	0.000	-0.002***	0.001**	0.001***	-0.000	-0.001	-0.000	-0.000
	(-5.90)	(-2.02)	(-6.92)	(-4.28)	(1.28)	(-8.65)	(2.25)	(2.90)	(-0.19)	(-0.99)	(-0.18)	(-0.80)
Growth rate of assets	0.023***	0.055***	0.019***	0.018***	0.014***	0.023***	0.075***	0.091***	0.065***	0.143***	0.196***	0.087***
	(6.63)	(7.76)	(4.67)	(5.17)	(2.61)	(4.98)	(5.22)	(4.70)	(3.10)	(6.83)	(6.78)	(2.77)
Cash flow volatility	0.080***	0.178***	-0.001	0.175***	0.137***	0.181***	-0.017	-0.114	0.032	0.204***	0.183	0.217***
	(3.91)	(6.15)	(-0.03)	(8.61)	(5.48)	(5.64)	(-0.31)	(-1.18)	(0.46)	(2.78)	(1.26)	(2.59)
Leverage	0.000	0.001	-0.001	-0.005***	-0.006***	-0.001	-0.002	0.002	-0.006***	-0.006***	0.002	-0.012***
	(0.28)	(0.98)	(-1.41)	(-8.91)	(-9.61)	(-0.60)	(-1.11)	(0.84)	(-3.28)	(-3.12)	(0.46)	(-5.57)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	1567	686	881	1622	893	729	1280	523	757	1251	534	717
Adjusted R^2	0.136	0.195	0.151	0.229	0.263	0.298	0.184	0.312	0.178	0.222	0.256	0.237

In Table 7, the 2SLS results using expected coverage as the instrument also show a significant negative association between analyst coverage and discretionary accrual use. This is consistent with the OLS results, however the 2SLS coefficients are smaller. For sales manipulation, firms

that use it to increase earnings show a significant negative association with analyst coverage while those that use it to decrease earnings show a significant positive association. The result for firms that increase earnings is highly significant, which also shows in the OLS results in Table 6. Due to the strength and consistency of this result in both the OLS and 2SLS regressions, this may be a phenomenon worth noticing. This greater significance of 2SLS estimates over OLS estimates for sales manipulation was also the case when comparing covered versus uncovered firms.

Table 7. Level of analyst coverage, 2SLS regression results

The dependent variables are the absolute values of the respective earnings management metrics. Analyst coverage is a firm's analyst following on a logarithmic scale. The instrumental variable is expected coverage on a logarithmic scale. Positive and negative refer to firms with either positive or negative earnings management. T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

	Discretionary accruals (DA)			Sales manipulation (SM)			Overproduction (OP)			Earnings management (EM)		
	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative
Intercept	0.058***	0.018*	0.078***	0.036***	0.040***	0.018	0.253***	0.435***	0.157***	0.322***	0.481***	0.221***
	(7.52)	(1.74)	(7.24)	(4.59)	(4.16)	(1.53)	(10.67)	(11.70)	(5.15)	(11.23)	(10.10)	(6.25)
Analyst coverage	-0.004*	-0.002	-0.006**	-0.001	-0.006***	0.006*	0.004	-0.000	-0.002	0.001	0.001	-0.006
	(-1.85)	(-0.82)	(-2.11)	(-0.45)	(-2.71)	(1.74)	(0.73)	(-0.04)	(-0.20)	(0.20)	(0.09)	(-0.61)
Market to book ratio	-0.000	-0.002	0.001	0.005***	0.010***	-0.004***	0.003	-0.008**	0.017***	0.007**	-0.008	0.026***
	(-0.28)	-1.22	(1.28)	(6.45)	(9.62)	(-2.93)	(1.19)	(-2.15)	(4.84)	(2.27)	(-1.60)	(6.26)
Return on assets	-0.001***	-0.000	-0.001***	-0.000***	0.000	-0.002***	0.000	0.001	-0.000	-0.000	0.000	-0.001
	(-5.36)	(-1.16)	(-6.18)	(-3.05)	(1.53)	(-8.37)	(0.77)	(0.70)	(-0.09)	(-0.51)	(0.01)	(-0.74)
Growth rate of assets	0.008**	0.049***	0.006	0.009*	0.010*	0.019***	0.080***	0.105***	0.048	0.113***	0.149***	0.065*
	(2.13)	(6.41)	(1.24)	(1.87)	(1.68)	(2.67)	(4.40)	(4.66)	(1.59)	(4.84)	(5.04)	(1.66)
Cash flow volatility	0.237***	0.386***	0.148***	0.280***	0.240***	0.314***	-0.036	-0.141	0.080	0.624***	0.502**	0.790***
	(7.87)	(9.92)	(3.30)	(10.37)	(6.76)	(8.15)	(-0.43)	(-1.27)	(0.64)	(5.18)	(-2.39)	(5.44)
Leverage	0.000	0.001	0.001	-0.004***	-0.006***	0.003***	-0.004	0.004	-0.009***	-0.004	0.003	-0.014***
	(0.51)	(1.22)	(0.80)	(-6.37)	(-4.93)	(2.85)	(-1.59)	(1.19)	(-3.01)	(-1.35)	(0.85)	(-3.95)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	1283	566	717	1311	735	576	1120	447	673	1102	469	633
Adjusted R^2	0.176	0.283	0.183	0.247	0.329	0.340	0.163	0.320	0.162	0.224	0.262	0.271

5.2.3 Change in analyst coverage

Next, I look at how change in coverage affects the use of earnings management. Since there are various ways in which change in analyst coverage can be expressed, I use three different methods for a broader understanding of the effects. The first method uses the numerical change in a firm's analyst coverage on a logarithmic scale as the explanatory variable and the change in the absolute value of earnings management use as the dependant variable. Here I use two

years as the timeframe for change since it is unlikely that most firms adjust their earnings management behaviour based on single-year coverage changes. I also tested one- and three-year changes but two years appeared to offer the strongest results. On a side note, single-year changes are likely to be the significant alternative for firms who experience a complete loss or gain of coverage (one to zero, or zero to one analysts following them), due to which I attempt to measure this in one of the subsequent experiments. As mentioned earlier in Chapter 4.3, all the control variables also represent change rather than values. In addition, 2SLS regressions are not used in these tests since the presence of change analysis already mitigates endogeneity.

Table 8 shows the OLS regression results of the first experiment, numerical change in analyst coverage. The sample size is decreases by roughly a third due to the requirement of having a two-year change available. Discretionary accruals show a significant negative association with coverage change, like the previous tests of coverage as a dummy and level of coverage, especially among firms with negative discretionary accruals. Positive use of both sales manipulation and total earnings management show significant positive associations with change of coverage.

Table 8. **Numerical change in analyst coverage, OLS regression results**

The dependent variables are the two-year changes in the absolute values of the respective earnings management metrics. Analyst coverage is a firm's two-year change in analyst following on a logarithmic scale. Positive and negative refer to firms with either positive or negative earnings management. T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

2 year change	Discretionary accruals (DA)			Sales manipulation (SM)			Overproduction (OP)			Earnings management (EM)		
	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative	All firms	Positive	Negative
Intercept	0.002	0.032	-0.003	0.007	-0.009	0.029	0.008	-0.026	0.015	0.037	0.024	0.066
	(0.09)	(0.91)	(-0.09)	(0.28)	(-0.30)	(0.74)	(0.19)	(-0.42)	(0.29)	(0.63)	(0.32)	(0.65)
Analyst coverage	-0.012**	-0.009	-0.018**	0.007	0.016**	-0.002	0.016	0.027	0.014	0.008	0.060**	-0.012
	(-1.99)	(-1.01)	(-2.10)	(1.18)	(2.02)	(-0.20)	(1.38)	(1.27)	(1.05)	(0.48)	(2.03)	(-0.58)
Market to book ratio	-0.001***	-0.002	-0.002***	0.002	0.004*	-0.004	0.002	-0.001	0.010**	0.001	-0.005	0.005
	(-2.75)	(-0.82)	(-2.64)	(1.36)	(1.94)	(-1.41)	(0.65)	(-0.18)	(2.08)	(0.20)	(-0.67)	(1.12)
Return on assets	-0.001***	0.001**	-0.001***	-0.001***	0.000	-0.002***	0.000	-0.002**	0.001**	-0.001	-0.004**	0.000
	(-3.19)	(2.03)	(-4.04)	(-3.93)	(1.03)	(-6.47)	(1.22)	(-2.03)	(2.08)	(-1.07)	(-2.35)	(0.42)
Growth rate of assets	0.013**	0.036***	0.003	0.022***	0.022***	0.023***	0.083***	0.154***	0.005	0.126***	0.210***	0.045
	(2.15)	(4.17)	(0.32)	(3.54)	(2.63)	(2.60)	(6.32)	(7.51)	(0.31)	(5.78)	(6.01)	(1.58)
Cash flow volatility	0.062	0.075	0.035	0.155***	0.105*	0.205**	0.005	-0.541**	0.232**	0.441**	0.798	0.367*
	(1.07)	(0.93)	(0.43)	(2.91)	(1.77)	(2.14)	(0.05)	(-2.38)	(2.35)	(2.25)	(1.64)	(1.81)
Leverage	0.004***	0.003**	0.006***	-0.002	0.001	0.001	-0.002	0.002	-0.002	0.002	0.011*	-0.005
	(3.33)	(2.18)	(-2.87)	(-1.30)	(0.32)	(0.62)	(-0.83)	(0.55)	(-0.60)	(0.68)	(1.92)	(-1.09)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	808	350	458	837	462	375	701	312	389	681	311	370
Adjusted R^2	0.052	0.094	0.078	0.043	0.031	0.149	0.084	0.181	0.066	0.070	0.171	0.002

The second method for measuring change also looks at two-year changes but it treats coverage change only in terms of increase or decrease rather than on a numerical scale. Using dummy variables for increase and decrease, this method simply shows what effect the direction of change has on a firm's earnings management behaviour, completely ignoring the magnitude of change. In this test the table includes two columns for each earnings management metric rather than three, one describing the effects of increased coverage and the other for decreased coverage. For example, in the Increased columns of Table 9 the dummy variable is given 1 for observations in which there was a two-year increase in coverage and 0 for those in which coverage decreased or remained the same. In the Decreased columns, the dummy variable is 1 for observations in which there was a two-year decrease in coverage and 0 for those in which coverage increased or remained the same. The table now also includes an additional row below number of observations which discloses the number of observations that were assigned value 1. This is important for seeing whether the number of applicable observations is large enough to draw reliable conclusions.

Table 9. **Increase and decrease in coverage, OLS regression results**

The dependent variables are the two-year changes in the absolute values of the respective earnings management metrics. In the Increased columns, Coverage change dummy is 1 for firms with a two-year increase in coverage, and 0 for all other observations. In the Decreased columns, Coverage change dummy is 1 for firms with a two-year decrease in coverage, and 0 for all other observations. T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

2 year change	Discretionary accruals (DA)		Sales manipulation (SM)		Overproduction (OP)		Earnings management (EM)	
	Increased	Decreased	Increased	Decreased	Increased	Decreased	Increased	Decreased
Intercept	0.016	0.009	0.018	0.021	0.007	0.019	0.052	0.055
	(0.76)	(0.44)	(0.91)	(1.07)	(0.24)	(0.62)	(1.13)	(1.19)
Coverage change dummy	-0.013***	0.007	0.006	-0.003	0.021***	-0.016**	0.003	-0.012
	(-2.78)	(1.43)	(1.31)	(-0.59)	(2.67)	(-2.13)	(0.25)	(-1.11)
Market to book ratio	-0.000*	-0.000	0.002**	0.002**	0.001	0.001	0.002	0.002
	(-1.67)	(-1.56)	(2.48)	(2.49)	(0.62)	(0.59)	(0.76)	(0.74)
Return on assets	-0.001***	-0.001***	-0.001***	-0.001***	0.001**	0.001**	-0.001	-0.001
	(-3.49)	(-3.46)	(-5.01)	(-5.01)	(2.06)	(2.17)	(-1.28)	(-1.30)
Growth rate of assets	0.031***	0.031***	0.023***	0.024***	0.054***	0.055***	0.121***	0.122***
	(7.68)	(7.61)	(6.27)	(6.29)	(5.98)	(6.13)	(7.49)	(7.55)
Cash flow volatility	-0.041	-0.034	0.170***	0.167***	0.122*	0.102	0.226	0.228
	(-1.00)	(-0.83)	(4.67)	(4.60)	(1.75)	(1.48)	(1.59)	(1.61)
Leverage	0.001***	0.001***	-0.002***	-0.002***	-0.002*	-0.002*	-0.002	-0.002
	(2.79)	(2.67)	(-3.04)	(-3.05)	(-1.78)	(-1.76)	(-0.95)	(-0.92)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	1246	1246	1297	1297	1036	1036	1008	1008
# of dummy = 1	352	456	370	467	296	405	286	395
Adjusted R^2	0.078	0.074	0.093	0.092	0.079	0.077	0.063	0.064

Table 9 shows the OLS regression results for two-year increase and decrease in coverage. Firms that experience an increase in coverage decrease their use of discretionary accruals and increase use of overproduction in comparison to other firms. A decrease in coverage on the other hand is associated with a decrease of overproduction compared to other firms, reflecting a rather meaningful overall result for overproduction.

The third method for measuring change is like the previous increase and decrease test but only looks at the special case of complete gain or loss of coverage, meaning going from zero to one or one to zero in analyst following. The timeframe used here is only one year because the change in coverage at this level can be considered quite significant and therefore it is realistic to expect the potential behavioural reaction to be near immediate. The test uses dummy variables in the same way as Increased and Decreased were used in Table 9, but now the two columns in use are labelled Gained and Lost, identifying firms who have experienced a complete gain or complete loss coverage rather than any level of increase or decrease.

It is important to note that while the number of total observations in this test is adequate and comparable to all the other tests, the number of observations that are assigned value 1 for complete gain or loss of coverage is very limited as this is a relatively rare occasion at the scale of an entire marketplace. Simply put, for a firm to be assigned the value 1 it must have at some point in the sample period had zero analyst coverage which only applies to very few firms. Table 10 shows the OLS regression results for this test along with observation data, and the share of observations with dummy variable as 1 range from about 2.3% to 3.2%. This may impact the reliability of these results and highlights the need for caution when discussing their implications.

As for the actual regression results, Table 10 shows that firms that gain initial coverage decrease their use of discretionary accruals and increase their use of overproduction following the coverage change compared to other firms. This is consistent with what was monitored for a general increase and decrease of coverage, however the magnitude here is greater. There is also a less significant result for increased use of overall earnings management among firms who lose all coverage.

Table 10. Complete gain and loss of coverage, OLS regression results

The dependent variables are the one-year changes in the absolute values of the respective earnings management metrics. In the Gained columns, Coverage change dummy is 1 for firms who gain coverage, and 0 for all other observations. In the Lost columns, Coverage change dummy is 1 for firms who lose coverage, and 0 for all other observations T-statistics in parentheses. Statistical significance at the 10, 5 and 1% level is indicated by *, **, and ***, respectively.

1 year change	Discretionary accruals (DA)		Sales manipulation (SM)		Overproduction (OP)		Earnings management (EM)	
	Gained	Lost	Gained	Lost	Gained	Lost	Gained	Lost
Intercept	0.011	0.012	0.006	0.007	-0.002	-0.003	0.018	0.018
	(0.59)	(0.63)	(0.36)	(0.37)	(-0.06)	(-0.11)	(0.46)	(0.45)
Coverage change	-0.025**	0.009	0.001	0.015	0.054***	0.015	0.001	0.050*
dummy	(-2.25)	(0.80)	(0.06)	(1.38)	(2.92)	(0.83)	(0.05)	(1.73)
Market to book ratio	-0.000	0.000	0.001**	0.002**	0.006***	0.006***	0.008***	0.008***
	(-0.12)	(0.22)	(2.19)	(2.27)	(3.38)	(3.40)	(2.71)	(2.83)
Return on assets	-0.001***	-0.001***	-0.001***	-0.001***	0.000	0.000	-0.001*	-0.001*
	(-3.21)	(-3.29)	(-3.56)	(-3.67)	(1.27)	(1.29)	(-1.96)	(-1.90)
Growth rate of assets	0.031***	0.031***	0.021***	0.021***	0.063***	0.067***	0.155***	0.155***
	(7.60)	(7.45)	(5.38)	(5.48)	(7.56)	(8.05)	(10.41)	(10.51)
Cash flow volatility	-0.015	-0.009	0.113**	0.109**	-0.019	-0.053	0.155	0.105
	(-0.29)	(-0.17)	(2.51)	(2.44)	(-0.26)	(-0.71)	(0.68)	(0.58)
Leverage	0.000	0.000	-0.001**	-0.001**	-0.003***	-0.004***	-0.004***	-0.004***
	(1.40)	(1.13)	(-2.05)	(-2.14)	(-3.76)	(-3.77)	(-2.69)	(-2.82)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	1369	1369	1451	1451	1150	1150	1120	1120
# of dummy = 1	44	38	47	42	28	28	26	26
Adjusted R^2	0.084	0.081	0.055	0.056	0.084	0.077	0.099	0.101

Overall, these three different processes for testing the effects of change in coverage show mostly consistent results indicating a significant negative association with discretionary accrual and a positive but not quite as extensive association with overproduction. Sales manipulation and total earnings management do not indicate any significant results. These findings are also consistent with the previous tests of coverage as a dummy and level of coverage.

6 Discussion

The aim of this study was to learn how the presence of analysts affects earnings management behaviour in Finnish listed companies. This chapter takes a closer look at the empirical findings and how they fit into the context of prior research, what their significance and impact are on both a practical and academic level, and what type of limitations are present in the results and study overall.

The most robust finding is a significant negative association between analyst coverage and the use of discretionary accruals. There is strong evidence of this across all the different tests, both when comparing covered firms to uncovered firms as well as when measuring level of coverage and changes in coverage. In practice, the results mean that firms with more analyst coverage use less discretionary accruals while firms with less coverage use them more, and the greater the changes in coverage the greater the reverse effects on discretionary accrual use are. There is also evidence of this negative association when monitoring initial increases in coverage from zero to one analyst, but no significant effect is found among firms that lose all coverage. However, these two results are based on a limited sample size and thus require further research for verification.

The negative association between coverage and discretionary accrual use reiterates the findings of prior research on the topic, such as the foundational study by Yu (2008) which used data from US companies. However, Degeorge et al (2013) included Finland in their study which analysed how countries at different levels of financial development differ in the association between coverage and discretionary accrual use, listing Finland in group of least developed. The study concluded that greater analyst coverage resulted in less accrual-based earnings management activity, but only in countries with high financial development. In Finland, according to their results, covered firms use more discretionary accruals than uncovered firms and the difference between these two groups was in fact the largest among all the recorded countries. This result is opposite to my findings despite the use of similar methods, which may be explained by the smaller sample of only 203 observations and an earlier data period of 1994 to 2002 used in the

Degeorge et al (2013) study. Based on my findings, discretionary accrual use in Finland is more in line with the group of countries listed in the study as having higher financial development.

The results for overproduction are interesting because a positive association with analyst coverage exists but it only appears in tests that utilize dummy variables rather than variables that consider coverage on a numeric scale. For example, the results show that covered firms use more overproduction than uncovered firms, however using the level of coverage as a variable instead does not show any significant link to the use of overproduction. Similarly, the tests indicate that firms that experience any level of increase in coverage also increase their use of overproduction while any level of decrease in coverage is associated with a decrease in its use. However, when using the actual levels of change rather than dummy variables for any increase or decrease, the results show no significant associations.

Some indication of this same phenomenon can also be seen in Table 3 which simply outlines the average uses for each earnings management method by level of analyst coverage. It shows a growing use of overproduction as coverage moves from 0 towards 10 analysts, at which point the median level of use drops dramatically for firms followed by 10 or more analysts. Perhaps the association with level of coverage is only present among firms of certain size or level of analyst following or it is more industry-specific, but this question among others with regards to the above findings clearly require more specific analysis.

Overproduction has been found to associate positively with analyst coverage in prior research as well, such as by Sun & Liu (2016). They used the number of analysts as an explanatory variable and did in fact find a significant association, however they did not test simply covered versus uncovered firms which was determined relevant in this thesis. Another noteworthy observation regarding my results is that the effects of overproduction and discretionary accrual use in the result-producing dummy variable tests appear systematically opposite to each other. However, the tests used in this thesis are inadequate to make further conclusions regarding any possible relationship between these two methods of earnings management. Irani & Oesch (2016) recorded some evidence of simultaneous opposite changes in the use of discretionary accruals and real earnings management in reaction to coverage changes which could be a starting point for further research into this finding.

Of the three earnings management methods measured in this study, sales manipulation demonstrates the least meaningful results in relation to analyst coverage. In fact, there is no indication of any association when using all eligible firm-year observations to compare covered and uncovered firms or to measure effects of coverage level and change in coverage. However, there are two noticeable trends that are worth pointing out. First, the only significant results are found when observations are divided into two groups based on the direction in which sales manipulation is used to manage earnings, with most results occurring among firms with upwards management. Additionally, the two-stage least squares (2SLS) regressions offer more significant results than the ordinary least squares (OLS) regression which is unusual and contrary to the results for discretionary accruals and overproduction.

Prior research on analyst coverage and sales manipulation is slightly inconclusive, though most results such as Sun & Liu (2016) and Irani & Oesch (2016) point towards a positive association between the two. My results specifically among firms with upwards sales manipulation suggest that covered firms may use less sales manipulation and that higher levels of coverage lead to lower levels of its use. However, testing the effects of change in coverage demonstrates signs of an opposite effect and therefore these results are not strong enough for solid conclusions. The unusual differences between results of the two different regression models are intriguing as they only occur for sales manipulation. With all control variables being the same in these two models, one explanation could be that the instrumental variable of expected coverage which is used in the 2SLS regressions may be more meaningful in the context of sales manipulation compared to the other methods, resulting in stronger outcomes. This could be further researched by running the 2SLS regressions using other instrumental variables and comparing the differences in results.

Finally, in addition to measuring the use of the above earnings management methods separately, I also applied the sum of these three as an indicator of total earnings management use. While it is important to note that this metric only considers these three methods and overlooks possible other ways of managing earnings, the results offer no evidence of any meaningful association between analyst coverage and total earnings management. This may indicate that the effects of

the three methods are quite different from each other and that none of them are strong enough alone to impact the results of the combined use.

The results of this study expand the existing literature regarding the effects that analyst coverage has on management behavior, specifically earnings management use. It offers a broader perspective on geographical differences as most prior research focuses solely on US companies, also presenting the possibility that some of the limited research done earlier on international markets may not be extensive enough for reliable conclusions. The interrelated use and effects of different earnings management methods in relation to analyst coverage also remains a rather scarcely researched topic. While it does not establish clear conclusions on these effects, this study does monitor three different methods using the same sample to offer indication of any possibly links between them along with raising questions for future research. From a practical standpoint, understanding management behavior is a valuable part of investing decisions which again improves the functioning of capital markets, and these results can also be used to expand that knowledge.

The most obvious limitations of this study and its results have to do with the methodology. There are always decisions to be made on which models to use for the most accurate, consistent, and comparable results. Overproduction and sales manipulation have rather established models, but the measurement of discretionary accrual use offers several options from how to calculate total accruals to which of the rather similar but still slightly different estimation models to use. While the data sample is extensive and a good representation of the target population, measuring initial increases in coverage from zero to one and complete coverage losses from one to zero lead to severe exclusions to the sample size and thus results that are not fully reliable.

7 Conclusions

The effects of external monitoring on manager behaviour has been a focus of academic research for decades with one of the key topics being the use of earnings management. Managers have various incentives to manipulate their reported earnings both upwards and downwards, and this offers a fascinating opportunity to study how the presence of external monitoring by stock market analysts changes manager behaviour. To make this an even more interesting topic of research, two arguments completely contrary to each other both appear just as reasonable and logical. There is the 'monitoring' argument based on which the presence of analysts should constrain managers from committing any type of wrongdoing or misleading activities. And then there is the opposing 'pressure' argument which assumes that the pressure caused by analysts and their estimates lead managers to using earnings management to achieve short-term market expectations. However, given the different ways in which earnings management can be executed – the accounting-based discretionary accrual use and the operational-based activities referred to broadly as real earnings management – perhaps neither argument is entirely true and the effects depend on how manipulation is carried out?

This thesis studies the effects that analyst coverage has on earnings management behaviour among Finnish listed companies, examining the use of three different earnings management methods in different situations concerning analyst coverage. Using a total sample of 1640 firm-year observations from years 2005 to 2018, I find strong evidence that the way firms choose to manage their earnings is influenced by their level of analyst coverage. The key findings begin with a significant negative association between analyst coverage and discretionary accrual use across all measurements, with covered firms using it less than uncovered firms, more coverage indicating less use, as well as a similar negative effect from changes in coverage when monitoring both the direction and magnitude of change. Coverage is also associated with the use of overproduction, though not as extensively as with discretionary accruals. The association is mostly positive but does not appear to be noticeably affected by the magnitudes of coverage or change in coverage, only whether a firm is covered or not and what direction of change its coverage experiences. In summary, covered firms are found to use less overproduction than uncovered firms, and an increase in coverage results in more use while a decrease in coverage

results in less. Based on the findings of this study, analyst coverage is not associated with the use of sales manipulation in a significant manner.

I also calculate the combined use of these three methods and find that analyst coverage does not appear to significantly impact a firm's total use of earnings management. This may indicate that the use and subsequent effects of the three methods are quite independent of each other and that none of them seem strong enough alone to impact the results of the combined use. Overall, these results suggest that both the 'monitoring' and 'pressure' arguments apply, depending however on which earnings management method is being used as the monitoring effect of analysts appears to be true with regards to discretionary accruals while the pressure effect may apply to overproduction. This highlights the need to consider earnings management as individual methods instead of a broad term while also further researching the relationships between the different methods.

Two hypotheses were set for this study in Chapter 4.1, the first being that analyst coverage is negatively associated with the use of discretionary accruals. The findings of all the tests carried out in this study provide strong support for this hypothesis. The second hypothesis stated that analyst coverage is positively associated with the use of sales manipulation and overproduction. This hypothesis is only partially supported by the findings of this study as overproduction shows a mostly positive association, though it does not apply to the magnitudes of level and change in coverage as explained above and in more detail in Chapter 6. In addition, the results do not support any kind of significant association between analyst coverage and sales manipulation. These two methods were grouped together in one hypothesis since prior research has mostly found their use to behave in similar ways, but also in part because they are generally included under the term "real earnings management", referring to actions related to actual business operations. However, the results of this study show that perhaps this categorization should not be taken as anything more than a way of identifying different types of earnings management methods. Assuming any other shared characteristics or effects of these methods simply based on which category they belong to may lead to false conclusions.

The results of this thesis contribute to existing literature by expanding the geographical coverage as most prior studies have focused solely on US companies. Improving the understanding of

behavioural patterns globally is beneficial both for individuals and to support future research of other market and management behaviour. Most prior literature focuses on a single earnings management method whereas three methods are used here simultaneously to try and uncover any patterns among each other as well to get a more comprehensive view of earnings management use. In general, not treating earnings management as a single term, or real earnings management as just one uniform group of methods, but separately considering all the different actions that are available to managers seems crucial if both academics and investors wish to fully understand the behavioural aspects of financial reporting. Finally, a new easily accessible but effective instrumental variable alternative is presented which captures the variation in a firms' analyst coverage resulting from the overall analyst activity in the marketplace.

The outcomes of this thesis reveal many directions in which future studies can expand research around this topic. For a complete picture of earnings management behaviour, it would be beneficial to recognize all the different ways of manipulating earnings and research them side by side using the same data sets and methods for consistent and comparable results. For example, this study showed some opposite characteristics in the use of discretionary accruals and overproduction, therefore further researching potential simultaneous effects between methods could prove insightful. It would also make sense to look deeper into sub-samples such as industry-level results to understand if the effects originate primarily from certain industries, especially since the different methods may have certain industries to which they apply more heavily. Some of the findings proved inconsistent with prior limited results for Finland, possibly indicating that further geographical expansion of thorough research may be necessary. Lastly, this thesis does not intend to explain detailed reasons for why the reported relationships between analyst coverage and earnings management exist, it simply shares the findings. However, establishing the root causes behind these findings and more research into the behavioural explanations of the relationships overall would offer increased clarity and ultimately an improved understanding of the behaviour of capital markets.

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Appendices

Appendix 1. Descriptive statistics of sub-samples by industry and year

		Discretionary accruals														
ICB class	Industry	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	*N*
0	Oil & Gas	1	1	1	1	1	1	1	1	1	1	2	2	2	2	*18*
1000	Basic Materials	5	7	7	7	8	8	8	9	11	11	11	11	10	9	*122*
2000	Industrials	28	35	36	37	38	39	39	40	41	43	47	48	47	52	*570*
3000	Consumer Goods	13	14	14	14	14	14	13	14	14	14	14	14	17	19	*202*
4000	Health Care	2	4	4	5	5	5	4	5	5	6	8	8	10	10	*81*
5000	Consumer Services	8	9	9	9	9	9	9	10	11	11	13	14	15	15	*151*
6000	Telecommunications	2	2	2	2	2	2	2	2	2	2	2	3	3	3	*31*
7000	Utilities	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*14*
8000	Financials	8	8	9	9	9	8	8	7	7	8	9	10	9	11	*120*
9000	Technology	13	15	17	18	18	18	18	18	19	20	19	21	21	23	*258*
	N	*81*	*96*	*100*	*103*	*105*	*105*	*103*	*107*	*112*	*117*	*126*	*132*	*135*	*145*	*1567*
		Sales manipulation														
ICB class	Industry	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	*N*
0	Oil & Gas	1	1	1	1	1	1	1	1	1	1	2	2	2	2	*18*
1000	Basic Materials	6	7	7	7	8	8	8	9	10	11	11	11	10	10	*123*
2000	Industrials	36	35	36	37	38	39	39	40	41	43	49	50	49	51	*583*
3000	Consumer Goods	14	14	14	14	14	14	14	14	14	14	14	14	17	19	*204*
4000	Health Care	1	4	5	5	5	5	4	5	5	6	7	7	8	7	*74*
5000	Consumer Services	9	9	10	10	10	10	10	10	11	11	13	14	15	15	*157*
6000	Telecommunications	2	2	2	2	2	2	2	2	2	2	2	3	3	3	*31*
7000	Utilities	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*14*
8000	Financials	9	9	9	8	8	9	8	9	10	12	14	15	14	16	*150*
9000	Technology	18	18	18	18	18	18	18	19	19	20	19	22	21	22	*268*
	N	*97*	*100*	*103*	*103*	*105*	*107*	*105*	*110*	*114*	*121*	*132*	*139*	*140*	*146*	*1622*
		Overproduction														
ICB class	Industry	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	*N*
0	Oil & Gas	1	1	1	1	1	1	1	1	1	1	2	2	2	2	*18*
1000	Basic Materials	6	7	7	7	7	8	8	8	9	10	10	10	9	9	*115*
2000	Industrials	33	32	32	34	34	36	36	37	38	39	42	44	44	43	*524*
3000	Consumer Goods	14	14	14	14	14	14	14	14	14	14	14	14	14	15	*197*
4000	Health Care	2	4	4	4	4	4	4	4	4	5	6	6	7	8	*66*
5000	Consumer Services	9	9	9	10	10	10	10	10	11	10	13	14	14	14	*153*
6000	Telecommunications	2	2	2	2	2	2	2	2	2	2	2	3	3	3	*31*
7000	Utilities	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*14*
8000	Financials	2	2	3	3	3	2	2	2	2	2	2	2	1	1	*29*
9000	Technology	10	10	9	9	9	9	9	10	10	10	9	9	9	11	*133*
	N	*80*	*82*	*82*	*85*	*85*	*87*	*87*	*89*	*92*	*94*	*101*	*105*	*104*	*107*	*1280*